The Builder.

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Progress of the Metropolitan Main-Drainage.

SINCE we last reported progress of the great work of the sewerage of London, the main lines then begun, namely, the Northern and the Southern High-level Sewers, have been proceeded with; the Middle-level Sewer, north side of the Thames, has been commenced at Old Ford, and other parts of its course; and the Southern Outfall Sewer also has been commenced, and is being carried forward with energy. A commencement likewise has been made with the Low-level Sewer, south side, at Deptford. The line generally for the low-level is not yet tendered for. Since our last report also, much has been determined upon, or spoken of, which may need explanation to justify a claim for the accuracy of our original account of the whole scheme for the metropolis, and that of our subsequent particulars.

We allude in the last sentence, to the plans for the diversion of sewage from the Serpentine, and to the announcement that the low-level line, north side, would be taken along the Strand. The supposition here referred to, as to the Strand, is important so far as it has proceeded from a statement in the House of Commons, and been fortified by a *report* of Mr. Thwaites's evidence before the committee on the Thames embankment, and is apparently corroborated by the operations which have been commenced in various parts of the line, or at the ends of streets joining the Strand. Nevertheless, our original particulars in all points were correct; and they are so to this moment. Although a public meeting of the ratepayers of St. Martin's parish has been thought necessary on the subject, we have the best reason for stating that no decision has been arrived at subversive of the conclusions of the report by Messrs. Bidder, Hawksley, and Bazalgette, wherein the Strand line, which had been first proposed by the engineer to the Board, was abandoned in favour of a line on the margin of the river, to be in conjunction with an embankment. Besides the more obvious argument for the embankment line, one of the reasons was that by taking the Strand line, all the sewers between the Strand and the Thames would require to be reversed. Mr. Bazalgette himself is paying attention to the subject of the embankment, and has given evidence before the committee; so that the statements and apprehensions are at least premature.

It is necessary, indeed, for the engineer of the Board to anticipate so far, the rejection of an embankment scheme, as to take means to ascertain the nature of the strata in the Strand; and these investigations, desirable for many objects besides any of a particular sewer, are what are now in progress, and are the most that is at present contemplated. It occurred to some of the officers of the Board, from observation of the strata in Long-acre, that the London clay would be found within the space which the sewer would occupy, should the Strand line have to be chosen; and to certify this, borings were in the first instance made in a few places, from the position of inverts of existing sewers. It is now, we believe, quite ascertained that the clay exists as anticipated; so that the sewer, if in the Strand, would be tunnelled; and at least there would be comparatively little obstruction to the traffic,—since even the shafts for the execution of the work would be arranged in the manner of side-entrances, placed at the ends of the streets of junction, and might not differ very considerably from the present hoarded spaces where the borings are in progress. We trust, however, that the intention of the embankment line will be steadily pursued, and that the alternative will not for the present be further thought of.

Referring to the diversion of sewage from the Serpentine, which, it has been announced, requires the construction of a sewer from the head of the Serpentine, or from the Bayswater-road, to a junction with the Ranelagh Sewer, at Albert-gate,—that is to say, diverting, but conducting the contents of the sewer towards an outfall into the Thames; our original account and later particulars of the Middle-level Sewer remain correct. The Middle-level Sewer, to pass along the Bayswater-road, is to divert the sewage proper and the ordinary rainfall (as, indeed the existing sewer diverts these from the Serpentine); and these ordinary contents of the sewer will run on to the junction with the High-level Sewer at Old Ford, and further, or to the general outfall of the northern sewage, at Barking Creek. But as throughout the sewerage system which is in process of construction, means of escape for excessive rainfall are provided or left,—the existing sewers falling into the Thames (such as the Fleet, so far as its length where along Farringdon-street and Bridge-street), being made use of to a large extent,—means of relief would be required for the waters which at present on certain occasions flow over into the Serpentine, or required in substitution for that outlet. With such object, the sewer through the north-eastern portion of Kensington-gardens, and along the north of the Serpentine, is to be constructed, and tenders for it have recently been received. The line was not shown in the drawings of the Middle-level Sewerage, and was not decided upon at the time those drawings came before us.

The total length of the sewer in question, called the Ranelagh Storm-overflow, starting from the weir in the Middle-level Sewer, which is opposite the junction of the Ranelagh Main-sewer, or near the Crown Inn, and ending in a junction with the Ranelagh sewer just north of Albert-gate, will be 1 mile 420 feet. The greater part of the length, or 4,700 feet, will be 8 feet 6 inches barrel sewer; but the first or upper portion of the whole length, 520 feet, will be equal in area to 9 feet barrel; and the lower portion, 480 feet, to the same diameter. The inclination will be 1 in 421·5, or 12·5 feet per mile. Borings appear to have been taken in the line at six places. The sewer is intended not only to provide the overflow for the storm-waters from the upland districts, and intercept any sewage matter from the Serpentine, but also to provide means for drainage of the barracks and other Government property in the park. Her Majesty's Commissioners of Works contribute 2,000*l*. The engineer's original estimate was about 23,000*l*.; but this was afterwards somewhat increased. Tenders, however, were received at the end of last month, which were all, except one out of twelve, in excess of the estimate; several of them considerably so. The excess is ascribed to the rise in the price of materials and the complicated state of the labour market. The accepted tender, by Mr. Treadwell, amounted to 35,455*l*. Operations will be commenced in a day or two.

The work commenced towards the formation of the Low-level Sewer, south side, is near to the railway and bridge over Deptford Creek; and is not far from the site of the intended pumping station (which we have already described), but on the opposite, or western, side of the creek. The portion of the sewer is commenced now, in consequence of the intended construction of a new gas-holder at the works adjoining. The work of this sewerage is in the hands of the contractor for the ordinary jobbing of the sewers in the district. The ground is in great part loose sand copiously charged with water; whilst the excavation—at present about 130 feet long by 23 feet broad, and 46 feet deep—reaches to the edge of the creek, or very nearly, and goes down to 22 feet below the bed of it; so that, altogether, the work is of a peculiarly difficult nature. Four pumps are constantly going by steam,—having to raise upwards of 3,000 gallons of water a minute, constantly impregnated with sand, and often so to an extent which would stop the action of ordinary pumps. Our readers will not have forgotten our interrogatory to the engineer of the Board of Works, relative to the intention to use valved pumps at the Deptford Pumping-station. The pumps now in use at Deptford, working day and night, are chain-pumps. There is frequent trouble with them, owing to an accumulation of sand or earth; and valved pumps would be useless. Centrifugal pumps which served at Old Ford, it is thought would equally become choked in the present case. It is doubtful, however, whether the chains would wear sufficiently well to admit the use of pumps on the principle, for the constant service.

Besides the difficulty in the watery state of the soil, there is that of the looseness of the sides of the excavation. The wet sand begins at about 20 feet from the surface. Here sheet-piling or pile-planking, with the edges of the planks grooved and iron-tongued, is used; and the whole of the excavation presents a network of cross-strutting of timber, of which material alone the value may be upwards of 1,500*l*. Probably it may be necessary, besides the provision here referred to, to execute the whole of the work in portions,—in a considerable number of small coffer-dams. At the Broadway, Deptford, in the construction of the High-level Sewer so far as completed, or in difficult ground, iron sheet-piling was used where not required to be left in; and the same kind of piling will be adopted in the present case wherever the circumstances are similar.

Difficulty has arisen both in this portion of the southern drainage-works, and in those of the Middle-level Sewer, north side, from the present scarcity of bricks. The price of bricks has risen, perhaps chiefly in consequence of the demand for the sewerage works, higher than we have known it since the duty was taken off. The first bricks brought to the works of the Middle-level Sewer had to be condemned; and the same thing occurred in the works we are noticing as regards bricks of average quality, though not equal to the requirements, where the price given, we were told, had been as much as 44s. a thousand. The price now being paid is said to be 45s. a thousand.

The Southern High-level Sewer is complete so far as the length of the Broadway, and some distance along the road westward towards the North Kent Railway,—whilst each of its branches traced upwards, is in progress at several points; but it has yet to be carried along Church-street to the storm-water outfall. We must notice any points of interest in the work here, or in different parts of the same division of the sewerage, as in the case of the tunnel at Dulwich, and also any points in the work of the Outfall Sewer towards Woolwich, and in the marshes, on some future occasion. Mr. John Grant, the engineer for the southern district, is the resident engineer under whose immediate direction the works we have last noticed are being carried into effect. These operations, and the bulk of those yet uncommenced, will task all the skill of the officers of the Board of Works, and all the resources of contractors.

ON THE ORIGIN OF OUR EMOTIONS OF THE BEAUTIFUL.*

THESE are pleasures that have nothing in common with æsthetic beauty, and ought not to be considered when forming a correct estimate of a design. To do that we must disconnect our ideas from any biassing or accidental associations, and judge of it as a whole in relation only to itself and the mind contained in it. Afterwards, when our judgment has given its consent—for the activity of the critical faculty cannot co-exist with art-pleasure, the imagination may revel in intoxicating delight, and serve to heighten the inherent charms of the work.

The beauty of a problem in Euclid to which geometric beauty has much in common may be considered to be inherent as well as associative; for truly the mind recognizes it as such in its first impressions. It is a sort of acknowledgment of

* See p. 374, *ante*.

the harmony of its properties and the fulness and completeness of thought contained in it. It is a discovery of the relation existing between its own members, and exemplifies the unity of universality —an idea complete in itself. All works of art must have this inward relation and coherence, otherwise they remain unfinished ideas. This unity of purpose and object gives in art that high quality termed repose. For a work cannot have repose unless it is at rest within itself, and the object is represented as well as the action. The Fighting Gladiator is the representation of action with its object beyond its own circumference. While the Laocoon, as a complete work, contains all within its own circle, a complete incident, and notwithstanding the convulsions of the figures, possesses repose, considered in the group,—the Fighting Gladiator is an anomaly seldom found in art. Gibson's Hunter, than which there never was a more perfectly knit and gracefully-turned figure—strong, yet elegant—the very perfection of manly *physique*, is slightly liable to the same objection. That most beautiful figure of the mad Ophelia, by Calder Marshall, which was exhibited at the Manchester Art Treasures Exhibition, and is as exquisite a production as was ever turned out of an artist's studio, possesses also the merit of being a self-contained work. How miserably poor are Canova's Venuses, compared with the sublime sentiment of melancholy, womanly madness conveyed by this artistically complete statue, the very impersonation of Shakspeare's creation. With her hand clutching the rock, and her sweet, mad face turned up to Heaven, a more affecting sight it were impossible to conceive. This is the true modern sculpture—beautiful, expressive, yet classically true, individual in character, and as far superior in healthy sentiment to the god generalities of the Greeks as Shakespeare is wiser than Homer.

Of the value of this completeness and relation of parts we may judge by comparing Bulwer's "Caxtons" with "My Novel." The first is as complete a work of art in every respect, and as interesting, instructive, and learned a novel as ever was written. The latter bids fair at first, even to outdo its predecessor, for in it there is the most exquisite description of a quiet country life among characters so diverse, original, quaint, and clever, combined with such repose, completeness, and finish, artistically considered, up to the end of the first volume, that the bustling activity and hurrying incident of the second reminds one more of Reynolds than Bulwer.

Æsthetic beauty is mind as well as sensational beauty. It is the mind that estimates proportions and judges of the harmony of relations, but by intuitive perceptions rather than reasoning power. The thickness of a beam or column, or any structural support required to carry a certain weight, may be calculated to a nicety if the length be given, provided we have made ourselves acquainted with the comparative strength of the material. But it would be impossible to calculate ratios of proportions except in time-music; for the formula would be so involved as to be inextricable: consequently we must rest satisfied with the natural capacities of judging by sensational effect: our process must be inductive, not deductive. Æsthetic effects may be sensationally pleasing, from the varied play of light and shade, independently of any associations, and, I think, may also be perceived without much exercise of mind. Sensations are the foundation of beauty; the mind judges, arranges, compares, and thus leads to a correct knowledge of effects, and to intellectual satisfaction. With the ordinary observer the intellectual pleasure is much smaller: he judges through naturally acute perceptions and correct associations, but receives most pleasure through the indulgence of the imagination.

The question naturally presents itself to the mind,—Does associative beauty please through the discovery of similarity, or would the impression which provokes it equally please us, were it not associated with some property or quality? I think it would not, for expressional beauty pleases us through the beauty of the sentiment conveyed, and that is a beauty which we could not see except in connection with something else. Admiration is excited by elevation of character, loftiness of purpose, and decision of will,—these beauties belonging rightfully to the human mind; yet the imagination connects these qualities with material and lifeless objects through similarity in the ideas present. A great rock is said to be *grand* and *noble*. In that expression we at once detect the connection between the original idea of nobility and the object which, from its *expression*, excites the associative power of the imagination. Unconscious association has nothing in common with the imagination; but expressional beauty is due to the images excited in the mind by the impression. The one is passive assent; the other active energy of the mind and soul.

The theory that association of ideas is the sole cause of our emotions of the beautiful, is one which, at first sight, seems likely to be true. Many have taken this view as well as Alison; but any one willing to take the pains to test it, will find how incapable it is of accounting for all beauty. The theory has arisen from confusion of terms and want of clearness in distinguishing the several functions of the mind and sensations. For my own part I consider that the associated faculty has beauties peculiarly its own, and that it is, also, in itself, the means of *intensifying* our emotions and sensations. It causes a re-action of the mind upon the body, or sensations exalting our faculties and rendering them keen and acute. Its principal use, then, is in heightening our pleasure in the beautiful from passive satisfaction to active delight. The sight of a fine building, a beautiful vase, a charming picture, may not at all times raise in us any pleasure which approaches delight from the inactivity of the associative faculty; while at others they may hold us in wrapt admiration. If we see a beautiful picture when the mind is either inactive, or engaged with some other object, the beautiful is acknowledged, but the pleasure is but transitory. Reasoning from this, Alison has supposed that the pleasure is owing entirely to the association. I think, however, if we will take the trouble to examine and note the mental process involved, that we experience satisfaction before any active association can possibly be formed, and often unknowingly exclaim,—"How beautiful! how splendid! what a charming landscape! what a delightful prospect!"

It is quite true that a magnificent view, suddenly bursting upon you while perhaps traversing the gorge of a mountain, creates a quick sense of delight and expansiveness of mind, which may partly result from association, unconsciously rapid, undeveloped, and mysterious; but can we possibly argue from this, that inherent beauty does not exist. Absurd! to suppose that the association of one thing which gives no inherent pleasure with another thing, equally dull, can ever excite such intense satisfaction. Such would actually be the creation of something out of nothing. No; there are certain things which in their nature are necessary to our being in which we move and breathe, and have our existence; and it is one of the bounteous gifts of God to man, that the knowledge of this should be unconsciously associated with their effect, and prove an added gratification. "And God said, Let there be light, and there was light; and God saw that it was good." There is the soul of light—speaking out. God saw that it was good—good in every respect—consequently, *beautiful*. We cannot separate the sight-beauty from the knowledge of its innate goodness, its necessity to our health and vitality, its all-renewing powers from its radiant splendour. The soft, diffusive, all-pervading quality of daylight has been felt and admired by generations of authors. Addison, in the *Spectator*, speaking of mirth compared to cheerfulness, treats us to a beautiful simile. "Mirth," says he, "is like a flash of lightning that breaks through a gloom of clouds and glitters for a moment; cheerfulness keeps up a kind of daylight in the mind, and fills it with a steady perpetual serenity."

In these and such like figures and similes, which we think beautiful, the authors display a hidden sympathy with the objects,—an entering into their very nature. If they describe rocks, it as if the immovable matter were endowed with reason and feelings, for they speak and think. What is it that gives such a quiet, humorous charm to Sterne's description of the famous Lyons donkey unless it be that we are brought into communion with the donkey ideas, real or supposed? Sterne's imagination endowed the creature with thought and feeling, and in this imaginary conversation with a dumb animal we trace through an exquisite humour the exact truth of the description, for not only is its outward mien correctly represented, but its donkey feelings are photographed to a nicety. It is the kind spirit of the writer that irresistibly engages our sympathies with the poor oppressed brute. Had the same donkey been described by a man of malicious feelings, either our hearts would not have warmed towards the donkey, or our indignation would have risen against the man, or we should merely have looked on and laughed heartlessly.

After reading any of the poets, how absurd it seems to attribute all beauty to the discovery of the relation of parts or the hidden harmonies of nature, for the harmonies of nature I take to be dependent upon proportion or relation of parts,—a natural sequence by which three proportions being given, the fourth can be evolved. Harmony is the result of proper arrangement of effects regarding the strength of each, and must be found in everything beautiful; for, without this natural sequence, whether it be of form, or tone, or time, or colour, or ideas, the object or work must be incomplete and incoherent. It does not follow, though, because harmony is one of the necessities of beauty, that to it must be referred the origin of all beauty.

Mr. Ruskin has well said, that it is neither accuracy of description nor attendance to the invariable that constitutes what is called poetry, for there may exist both without approaching in the slightest degree to poetic feeling. The words we use are sufficient to show us this; for we say emphatically, poetic *feeling*, not truth, nor accuracy, nor knowledge of the principles of nature, but something that excites our joy or grief, our admiration or awe, our compassion or indignation. Yet, still admitting this, accuracy *is* a beauty, and the invariable, or what is founded on general nature, has charms peculiarly its own. To distinguish between the effects of the various arts which address themselves to the mind and the imagination, to trace their course upwards from whence they sprang, to discriminate between the true and the false, and to study their common connection, is worthy of the highest intellect. Yet the greatest may feel humbled when, after laborious investigation, they find their range of thought so circumscribed that the subject of their study can only be comprehended piecemeal and in detail.

In a subject such as the one I have in hand, the additional difficulty of mental introspection presents itself. Should I, however, be instrumental at all in extending our knowledge of the beautiful, I will leave it to other and greater minds to form a more systematic philosophy.

The emotions of the beautiful, as I have said at the outset, may be classed under four heads, viz.: the sensational, the emotional or imaginative, the purely mental, and the moral. Frequently the sensational induces the other three, either separately or combined. It is, however, only with the first three classes that we have to do with, and any one of these may superinduce the other two. Thus, if it is a statue to which our eye is directed—say the Apollo Belvidere,—the first thing that strikes us is its artistic merit, the graceful pose, the elegantly inclined head, the attentive yet slightly scornful expression of the face, the quivering expectation of the lip, and the god-like air of the figure, too womanly to express great, rough strength, and too innately great to be human. We next, perhaps, turn our attention to the *drawing* and proportions of the limbs, and we here discover that the sculptor has produced these effects from a profound knowledge of nature and comparative anatomy; that the lower limbs have been lengthened, to indicate swiftness, and a female softness diffused over the frame, more in consonance with the radiant daylight beams he is the impersonation of. The countenance has been cleared of all gross animalism, and bears a lofty, elevated look, suited to the "Lord of the unerring bow."

On attentively noting down our impressions, it will be seen that the *graceful* sway of the figure is due to the expressional association by which curves express elegance; that the scornful throwing back of the head, and the slightly-parted and disdainful curve of the lips, express scorn and disdain, because we know from experience that the human countenance is affected so when under the influence of those passions. Elevation of character we admire, because we also admire the conscious knowledge and power which it represents. Now, the composition of the figure, its artistic pose, and the anatomical skill displayed in its design, are emanations of mind, and therefore are interpreted by mind: the pleasure we receive from them is mental. The former beauties, combined with these, produce an associated mental pleasure, from the knowledge of the amount of skill and the warmth of imagination possessed by the creator of the work.

And the mental attribute of the statue may possibly excite the imagination to activity from the superiority to most other performances possessed by it. The sensational beauty which it possesses is a yielding fleshy softness of appearance, due both to association and actual sensational feeling, for the effect of softness is perceived by the senses before the imagination discovers the connection between the sensation and actual touch. The softness of the effect may be divided into

what appertains to two classes of sensation,—the actual softness of the shades, though the substance may be as hard as marble, and the pulpy softness which we know by unconscious association of effect with cause belongs to some substances. Thus the human face may be drawn and shaded in the smoothest shades, yet appear like a hard substance. On the other hand, it may be painted in with a thick impasto, and appear yielding as living flesh.

The grace of curve and flow of line must also, I think, be attributed in part to sensational effect, for the curves lead the eye a sort of dance, as Hogarth has it; and though the expression of the lines is due to the exercise of the associative faculty, for those who have never paid any attention to nature, or who have never taken the trouble to detect the difference of effect in lines, their faculties being naturally wanting in acuteness, or have been unaccustomed to exercise their imaginations by calling up images to represent those effects more clearly to the mental eye, cannot by any means sympathise with the movement, or *feel* its grace, yet the original *sensation* must bear an analogy in its effect to the other qualities with which the imagination associates it.

It is only when the cause of an association is incidental that we can properly say that the beauty is not inherent, for if it is the *nature of the line* to produce a certain effect,—the cause of the beauty must be in itself, and be sensational. Some will perhaps be inclined to think that it is not in the nature of any forms to affect the senses in the manner we ascribe to them, but that the form being invariably found associated with some other quality, that it insensibly raises the idea of that quality in our minds. This may be the case *sometimes*, but softness of shade, purity of tint, clearness of outline, brilliancy of colour, depth of tone, richness of effect, are surely actualities which we express by means of words borrowed from analogous sensations. Also, in the case of expressional beauties, which, without doubt, depend more upon the imagination than any other; the effects are founded in Nature, and it is through our correct interpretation of her that we perceive them. Then why not consider that to be inherent which inevitably produces the same emotion in every healthy mind. We can no more dissociate *power* from craggy rock—for we perceive the *mass*—the intensity of the forces which have caused its upheaval,—than we can dissociate this universe from the evidence of creative mind. If it is the nature of mass to possess power, then is it not an inherent property which it possesses, and which the associative faculty only discovers?

No mental perception of beauty can be received excepting through the exercise of the associative faculty; for mental perception is mental action, and mind, energy, or thought consists of trains of associated ideas. It is in this limited sense only that association can be said to be the cause of beauty, for without mental perception our pleasures would not be far removed from mere animal enjoyment,—such as a dog may feel when let loose into a green sunny field. Our sensations, notwithstanding, form the substratum or foundation upon which the spiritual emotions are built, and animal enjoyment excites the latent mental energies to vigorous action.

Presuming that I have established the position that *the beautiful is the generic term we give to those qualities or combination of qualities which delight the mind, through the medium of the senses, the intellect, the imagination, or the moral feelings, either separatety or combined*,—it will be seen that the perception of beauty lies in the very nature of the faculties themselves, requiring no distinct single faculty for its due appreciation, and depending upon no one quality, such as truth, harmony, relation of parts, proportion, &c.; nor does it necessarily require the perception of design, but rather in its fullest and highest development requiring them all combined.

It has evidently been ordained that man shall discover the principles of nature, and in the perception of those principles shall feel delight. There have been implanted in man certain innate convictions and feelings in accordance with nature, or rather he has been so organized in harmony with outward things, that nature shall be to him a never-failing mine of instruction and delight. He is the chord that vibrates sympathetically with the mood of outward things. It has been decreed that while certain combinations please, through the very nature of the mind itself, and in the different balance of organism in different minds, we see the reason of the diversity of tastes. It is the province of practical art to point out the laws that govern these combinations, and the principles they must possess to please the human mind. On that subject this essay does not profess to treat, leaving it, perhaps, for some future occasion on which the practical application of the principles expounded, may be discussed more at length.

T. MELLARD READE.

ILLUMINATED MANUSCRIPT AS ILLUSTRATIVE OF THE HISTORY OF THE ARTS OF DESIGN.*

FROM the invention or introduction of writing in every country of the world to the present date, it has been customary, more or less frequently, as the current of civilization advanced or receded, to embellish manuscript with polychromatic decoration. Of a practice so steadily maintained in spite of ages of indifference and Vandalism, thousands and, indeed, I might say millions of specimens actually exist. Fortunately, the intrinsic value of the materials of which such volumes were made, offered no great temptation to barbarian cupidity, and many a precious codex still remains, which, stripped ruthlessly of the costly binding which once encased it, has been thrown aside as worthless by the very hand which despoiled it of the covers, or precious capsulæ, under which it was once exhibited to the admiration of the faithful, on the altars or lectisternia of the great cathedrals and churches.

Such memorials of the zeal, industry, piety, and taste, of our forefathers lay claim to our attention on two grounds, apparently different, but in reality one and the same, viz., their value as illustrations of the history of the arts of design, and the importance of those lessons of experience, which every artist may unquestionably derive from the study of the beautiful types both of form and colour which they present to his notice.

It is the former of these two divisions of the subject which constitutes the leading theme of the present paper, but as it would be comparatively deficient in usefulness, if I failed to establish the ultimate identity between that which may be regarded as historical, and that which may be looked upon as more strictly practical, I propose to do so very briefly in drawing this paper to a close.

To commence, therefore, with the historical portion of my theme, I need scarcely recall the facts, that not only was that which we know as the earliest type of writing the most pictorial, but it was also embellished with colour from the most remote ages. A glance at the pages of Rosselini or Lepsius, will suffice to convince us that the monumental hieroglyphics of the Egyptians were almost invariably painted with the liveliest tints; and when similar hieroglyphics were executed on a reduced scale, and in a more cursive form upon papyri, or scrolls made from the leaves of the papyrus, the common flowering rush of the Nile, illumination was also employed to make the leading pages more attractive to the eye. Nor was such illumination peculiar to hieroglyphic characters; it prevailed also, but not to the same extent, in the hieratic and demotic modes of writing. Of such papyri, notable specimens may be seen in the British Museum; the most wonderful in existence, however, is the remarkably interesting and graphic illustration of the funeral of a Pharaoh, preserved in the Royal Museum at Turin.

Extraordinary dexterity was acquired in a conventional mode of expressing complicated forms by a few rapid touches, and the life and spirit with which familiar scenes are represented, and ornaments executed, in both the early and late papyri, are truly remarkable. The precise extent, to which the Greeks and Romans were indebted to the Egyptians, for the origination and use of alphabetic symbols, the learned have not yet agreed upon. They have, however, concurred in recognizing the fact that Egypt certainly supplied the principal materials, by means of which writing was ordinarily practised. The primitive books of the ancients were no other than rolls formed of papyri prepared in the following manner:—Two leaves of the rush were plastered together, usually with the mud of the Nile, in such a fashion that the fibres of one leaf should cross the fibres of the other at right angles; the ends of each being then cut off, a square leaf was obtained, equally capable of resisting fracture when pulled or taken hold of in any direction. In this form the papyri were exported in great quantities. In order to form these single leaves into the "scapi," or rolls of the ancients (the prototypes of the rotuli of the middle ages), about twenty were glued together end to end. The writing was then executed in parallel columns a few inches wide, running transversely to the breadth of the scroll. To each end of the scrolls were attached rounded staves similar to those we use for maps. To these staves, strings, known as "umbilici," were attached, to the ends of which bullæ or weights were fixed. The books, when rolled up, were bound round with these umbilici, and were generally kept in cylindrical boxes or capsæ, a term from which the Mediæval "capsula," or book-cover, was derived. The mode in which the students held the rolls in order to read from them is well shown in a painting in the house of the surgeon at Pompeii. One of the staves, with the papyrus rolled round it was held in each hand, at a distance apart equal to the width of one or more of the transverse columns of writing. As soon as the eye was carried down to the bottom of a column, one hand rolled up, and the other unrolled, sufficient of the papyrus to bring a fresh column opposite to the reader's eye, and so on until the whole was wound round one of the staves, when, of course, the student had arrived at the end of his book.

Of such papyri I need scarcely remind you that no less than nearly 2,000 were found at Herculaneum, the whole so shrivelled and burnt up as to be susceptible of being opened only at the greatest possible risk of total destruction. By careful steaming, and a variety of ingenious processes, many have been unrolled and displayed. They proved, however, to possess little literary, and no artistic merit.

The first great improvement in book-making, was the substitution of sheets of parchment for the leaves of the papyrus. Necessity was in this case the mother of invention, for Pliny tells us, that owing to the illiberality and jealousy of one of the Ptolemies, Eumenes, king of Pergamus, being unable to procure the Egyptian papyrus, introduced the use of parchment prepared for taking ink and pigments.

The second, and even more important change was introduced, according to Suetonius, by Julius Cæsar, who first divided books into pages. His letters to the Senate were so made up, and subsequently all documents either emanating from, or addressed to that body or the emperors, were arranged much as our modern paper-books are. The volumes so formed were known as *codices*, a term which has been retained to express similar objects during the whole reign of Mediæval Latinity.

Although the rolls to which I have alluded, as having been discovered at Herculaneum, were devoid of embellishment, there is sufficient evidence that many of the classical manuscripts were elaborately decorated. Thus Martial alludes to a bookseller's shop opposite the Julian Forum, in which his works may be obtained, "smoothed with pumice-stone, and decorated with purple." Pliny tells us, that Varro illustrated his works by portraits of no less than 700 illustrious persons, and he assures us that writers on medicine gave representations in their treatises of the plants which they described. Seneca also alludes to books decorated "cum imaginibus." Such were the original classical illuminated manuscripts of the Augustan age.

A distinct class may, however, be recognized of somewhat later introduction into Europe than those in this simple style, founded, no doubt, upon Oriental models. The combination of brilliant colours, with gold upon purple, and other stained vellums, appears to have been derived by the Greeks from India and Persia, and continued to be preferred to the more sober style particularly affected by the Romans during the first three centuries, at least, of the Christian era. The earliest instance of Roman adoption of gold lettering on purple or rose-stained vellum is given by Julius Capitolinus in his life of the Emperor Maximinus the younger. It is therein related that the mother of the emperor presented to him, early in the third century, a copy of the works of Homer written in gold upon purple vellum.

Although evidence is wanting that both styles prevailed among the Romans, the simpler one may be assumed as having been most popular in Italy; as, after the transfer of the seat of empire to Byzantium, scarcely any of the more brilliant class can be traced as emanating from the Roman schools of calligraphy. On the other hand, the simpler style appears to have found but few admirers in Byzantium, since almost all the earliest examples which can be met with of the skill of the artists employed in the capital of the eastern empire are based upon that more brilliant style of illumination in which golden grounds and conventional ornaments, executed in brilliant colours, form the leading features of decoration. The Roman style may be considered as closely allied in its pictorial elements, originally, to the art of

* Read by Mr. Digby Wyatt, at the Institute, as elsewhere mentioned.

Pompeii and Herculaneum, and, subsequently, to that of the Catacombs; while the Greek style presented, originally, a close relation to Oriental prototypes, and, ultimately, to the popular art of the mosaic worker.

I shall briefly allude to a few of the principal existing specimens of each style, since they must ever be regarded as furnishing the best and indeed the only reliable illustrations of the painter's art during those ages in which classical tradition became all but extinguished.

The most important Latin illuminated manuscript known to the student of palæography is unquestionably the square Virgil of the Vatican. This originally contained fifty paintings, five of which are now almost entirely effaced. The text is written throughout with considerable regularity, in capital letters, in black ink, and its only ornaments are paintings of subjects derived from the Ænead. They are executed in body colour, with great spirit, and a very free hand, but are wanting in finish, and in any considerable attention to gracefulness of composition. The whole of the accessories, architectural and picturesque, are purely classical, and the costume, arms, and technical execution are perfectly characteristic of the fourth century. They are not accompanied by any purely ornamental frame-work, but are separated from the text only by plain, narrow, red bands. It is right to notice this, as in almost all manuscripts of Latin origin a similar mode of simple framing of painted subjects may be observed. The two subjects of this series most interesting to architects are unquestionably those which represent Achates and Æneas inspecting the works undertaken by Dido for the beautifying of Carthage, and King Latinus receiving the ambassadors of Æneas. In the former, masons and other artificers are represented at work, and a curious illustration is given of the primitive crane, worked by a large wheel. In the latter the Trojans approach Latinus, who is seated before a temple with an octastyle portico, the pediment of which is filled with sculpture, and the general architectural character of which is exceedingly clearly defined.

A much ruder series of illustrations of leading incidents in the Ænead is also preserved in the Vatican, in a Virgil, probably, of the fifth century, formerly in the Parisian monastery of St. Denis. The celebrated Terence of the Vatican is a classical MS., of little less interest and importance than the square Virgil, being similarly illustrated with miniatures, but of a much ruder description.

So far as ancient texts are concerned, irrespective of illuminated decoration, some of the most valuable now extant are those which belong to the peculiar class of books known as *palimpsests*, that is, books which have been twice written over, the original writing having been, as far as possible, expunged, in order to provide a fresh surface of vellum for receiving later transcripts. The most important of this class was unquestionably the treatise of Cicero *De Republica*, discovered under a copy of St. Augustine's Commentary on the Psalms, by Cardinal Angelo Mai, the celebrated librarian of the Vatican.

The Imperial Library at Vienna is rich in Roman MSS., of scarcely inferior interest to those contained in the Vatican. The most elegant is a calendar, decorated with eight allegorical figures of the months. Although of about the same period as the square Vatican Virgil, it differs from it in containing, in addition to pictorial representations, numerous elegant ornaments of a conventional description. At Vienna is also the exceedingly curious MS. "Dioscorides," a work of peculiar interest in the history of painting, since not only does it contain in its text the earliest allusion to that property of drying which renders *oil* an eligible material for the painter's use, but in one of its miniatures, illustrative of invention, it shows a scribe writing, and an artist engaged in painting a picture placed upon an easel differing but little from those in use at the present date. In one hand the artist holds his palette, and with the other he is applying the colour to the surface of his picture. At his feet is a slab upon which his pigments are disposed for transfer to his palette. The date of this interesting MS. is satisfactorily fixed by the fact of its containing an elegant portrait of the Empress Juliana Anicia, for whom it is known to have been written at the commencement of the sixth century.

The Ambrosian Library at Milan contains a Homer with fifty-eight pictures, corresponding with those of the Vatican square Virgil. The Laurentian Library at Florence possesses the celebrated Medicean copy of the latter author, a codex much esteemed for the purity of its text, although devoid of illumination. The Paris Prudentius may be said to correspond (with the exception of a difference in the form of the capital letters in which it is written) with the Medicean Virgil.

The purest of the classical MSS. were written in regularly-formed capitals. The next and less perfect class is that in which the characters consist of what are known as rustic capitals, or those in which the writing is slightly inclined, in a manner corresponding with many of the inscriptions which have been found rudely scratched upon the walls of the houses at Pompeii, and in the chapels and other apartments of the catacombs.

Another variety of writing in capital letters was that known as the *uncial* style, which was the first approximation to a cursive or running hand. These letters generally resemble capitals, but instead of being angular are to a great extent composed of rounded forms. Specimens of this uncial character may be traced in the fourth century, and it appears to have changed little until the seventh. It is in this character that the Dioscorides of Vienna is written, while the later of the two Vatican Virgils already mentioned, and the Paris Prudentius, are in the rustic.

The uncial character, or rounded capital, was a transition to the *minuscule*, or "lower-case" letter, which at length became an entirely distinct character from the alphabet of capitals, the latter being generally known in contradistinction to the *minuscule* as *maguscule*; but whilst a knowledge of the exact sequence of the varieties of character in which illuminated MSS. have been written, is essential to enable us to arrive at any approximation to a correct determination of the age of any such work, I do not propose to dwell upon this branch of the subject here, but rather to confine myself to the illuminations, which have more direct interest for us as artists.

Having adverted to a few of the most important of the simpler class of classical MSS., I will now proceed to allude to the principal specimens of the more gorgeous kind, including those known to have been executed in the Eastern Empire, at the same time that those already described were completed in the Western.

St. Jerome, writing in the fourth century, exclaims in a well-known passage,—"Let those who will have old books written in gold and silver on purple parchments, or, as they are commonly called, in uncial letters,—rather ponderous loads than books,—so long as they permit me and mine to have poor copies, and rather correct than beautiful books." The principal vo'umes still existing corresponding with the description given by this great father of the Church, are the celebrated "Codex Argenteus," of Ulphilas, written in gold and silver letters upon a purple ground, A.D. 360; the Psalter of St. Germain de Pres; a fragment of the New Testament in the Cottonian Library (Titus, c. 15); and a copy of the Book of Genesis in the Imperial Library at Vienna; the three latter of which are believed to have been executed during the fifth and sixth centuries.

All of these, it may be observed, are in the Greek character, and, with the exception of the Codex of Ulphilas, may be considered as the production of Greek scribes. The only one which contains miniatures is the copy of Genesis, at Vienna, which is illustrated by no less than eighty-eight. These correspond very closely with the paintings which once enriched another celebrated Book of Genesis, which belonged to Sir Robert Cotton, and was almost entirely destroyed in the fire at Ashburnham House, in 1731, which consumed so many irreplaceable relics of past ages. The Cottonian Genesis, as far as can be ascertained from collections made previous to the fire, and from the charred and shrunken fragments which are all that now remain of this precious volume, contained no less than 250 miniatures, each about 4 inches square. These two remarkable versions of the Book of Genesis are supposed to be of nearly equal date, a slight precedence in point of antiquity being conceded to the English specimen. The Vienna text is written, as we have remarked, in letters of gold and silver, while that of the English version is throughout in black. Gold in the English volume is but sparingly introduced in the miniatures; and Dr. Waagen remarks that only the hatched gold upon the borders, the glories, and the lights upon the crimson mantle, indicate the commencement of Byzantine art.

That which is supposed to be the most ancient of all the texts of the Holy Scriptures, the Codex Alexandrinus of the British Museum, is written throughout (with the exception of the first three or four lines in each book which are in *red*) in *black* letters; a slightly ornamented pen-and-ink line drawn at the end of each book being the only decorative feature contained in it.

The libraries of the Vatican, as well as those of Paris, Oxford, and London, contain other specimens of brilliant ancient MSS., written in gold and silver letters, for the most part, no doubt, at Byzantium previous and immediately subsequent to the age of Justinian. There can be very little question that an important modification in the character of illuminated MSS., and, indeed, of all the arts of decoration, took place during the impulse given to the arts by the important works carried on by command of this emperor during the middle of the sixth century. The relations which existed between the empire over which he reigned, and the ruling powers of Persia, were exceedingly intimate, and there can be little doubt that the fruits of the "eternal peace," which he concluded with Chosroes Nushirvan, in the very year in which the great church of Sta. Sophia was commenced, A.D. 532, may be traced in the golden grounds, the jewelled ornaments, and brilliantly coloured conventional foliage, which speedily and almost completely superseded the traditions of Roman art, which had greatly declined during the interval which occurred between the removal of the seat of empire from Rome to Constantinople by Constantine, in the year 329, and the accession of Justinian, in the year 527.

The most interesting illustration of the participation of the art of illumination in this change we may be proud to possess in this country in the celebrated and unique Eusebian canons, executed on an entirely gold ground, two leaves of which, painted on both sides, are preserved in the British Museum (Addit. MS. No. 5111). Their beauty of colouring is very great, and both in that respect and in the peculiar forms of the ornament by which they are decorated, their divergence from classical tradition, and their affinity to Oriental art, will be at once perceptible. In the more pictorial features, such as the small portraits introduced in circular compartments, they exhibit a mode of painting strictly in consonance with antique precedents, and still retained in tolerable perfection.

To whatever degree this pictorial power might have degenerated from the comparative excellence of Classical ages, it is to be remembered that it was far in advance of any other school at that time existing. The social and political convulsions which prostrated the Latin empire before the Goths, the Vandals, and the Lombards, reduced the traditions of Roman art to an utterly effete condition in the land in which they had once reigned paramount; and it was in the Eastern empire alone that art found that protection and comparative tranquillity under which it can alone fructify.

While all was dark in Europe, with the exception of the flickering light still casting an occasional ray from Constantinople over countries far remote, a new light and a new school were springing up in the islands of the extreme west. The learned have differed in their recognition of the immediate means by which Ireland first became Christianized. It is, however, generally admitted that that providential change from utter darkness to true light took place at a very early period. That the Irish were in possession of some of the most ancient versions of the Gospels is quite clear from the texts of their earliest MSS., which differ essentially from the version introduced by St. Jerome towards the close of the fourth century. The oldest of these works date from the sixth century, and exhibit a series of entirely original features in the extraordinary illuminations by which they are decorated. Many of their saints were distinguished scribes, while their schools became so celebrated throughout Europe as to be resorted to by students from many distant lands. In the school of Finian, which is said to have included no less than 3,000 scholars, the great St. Columba, or Columbkill, who was born A.D. 521, was instructed in many arts; and in that of illumination he became specially and justly famous. He it was who about the middle of the sixth century, established that celebrated monastery in the island of Iona, or Icolumbkill, which was subsequently transferred under the Irish monk, St. Aidan (635, 651), to Lindisfarne, and from whence St. Cuthbert and his learned associates, spread true religion and sound knowledge far and wide in the north of England. In the library of Trinity College, Dublin, is preserved a precious volume containing an entry of extreme antiquity, relating that it was written by St. Columbkill himself, in the space of twelve days. It is copiously decorated with what Mr. Westwood (who has done more than any other student to spread a knowledge

and illustration of this interesting school of caligraphy) has designated as "tesselated interlaced ornament." Nor is this by any means a singular specimen of Celtic art of the sixth century, since many other volumes of even greater intricacy and elaboration are extant in Ireland, England, France, Germany, and Italy.

The remarkable diffusion of MSS. executed by Irish scribes is accounted for by the exemplary efforts and untiring peregrinations of the Irish and early Anglo-Saxon missionaries. Thus St. Boniface, the apostle of Germany, carried with him to that country his precious book of the Gospels, still preserved as a relic, and a highly-prized one, at Fulda. St. Kilian took with him to Franconia books, still preserved at Wurtzburg. In the public library of St. Gall, in the canton of Switzerland which still bears his name, records of the labours of the saint still exist; and not only did these curious volumes help to form the schools of caligraphy which afterwards became celebrated in Germany and elsewhere, but, in the monasteries which they founded, the saints themselves educated scribes to imitate the writings originally brought from Ireland. Thus, as M. Libri, the great bibliographer, has justly observed, "One cannot help remarking that the most celebrated of these pious missionaries, St. Columbanus, laid the foundations at Luxeuil, in France; at St. Gall, in Switzerland; and at Bobbio, in Italy, of three monasteries which afterwards became famous for their admirable MSS., in many of which, the influence of the Irish and Anglo-Saxon schools can be recognized at a glance. The Bobbio MSS. are known everywhere by the discoveries which have been made in the palimpsists, which once belonged to that collection. As for the MSS. of Luxeuil they have been dispersed; but the specimens of them which are to be found in the Libri collection, joined to what has been published on the subject by Mabillon, O'Conor, and others, prove unanswerably that in this abbey, as well as in that of Stavelot in Belgium, and other ancient monasteries on the Continent, a school of writing and *miniature* had sprung up, as remarkable for the beauty of its caligraphy as for the care applied to reproduce the forms of the Anglo-Irish schools."

I have never seen any MSS. demanding for their execution greater truth and delicacy of hand than some of these Irish productions, and more particularly the "Book of Kells," a treasure preserved in the library of Trinity College, Dublin, which tradition asserts to have belonged to St. Columba himself. The volume consists of 339 leaves, each 13 inches by 9½ inches. The text is that of the Gospels, and is considered by Biblical students to be a version antecedent to that of Jerome sanctioned by Pope Damasus. In this, like other contemporary books of Gospels, the Eusebian canons precede the sacred texts, and these are written, as is also usual, in arcades. In this respect, and in the conventional attitudes of some of the figures, can be traced the only analogy they present to ancient Byzantine or Latin MSS., from which they totally differ in every ornamental detail. With the exception of certain flat tints, forming the fillings in, the whole of the work appears to have been executed with an extraordinarily fine pen; there is no attempt whatever at any expression of light and shade; the whole is perfectly flat, and no graduated tints are introduced. Gold I have never yet seen in a genuine Irish MSS., and, although it is to be found in same of the books executed in a similar style in England, I do not think that it was ever used in Ireland itself. The power of depicting the human figure was almost entirely wanting, but occasionally some of the animals occurring in the lacertine combinations of ornament were drawn with an approximation to correct form. The colouring, however, is invariably most conventional in its arrangement. The leading elements of ornament are interlacing bands, terminating in spirals, coiled most eccentrically one within another, and interwreathed birds and animals struggling as if in interminable contest. The surfaces inclosed by lines or by ornaments such as those described, are frequently covered over with geometrical patterns of extreme minuteness, executed by repeated symmetrical touches of a finely-pointed pen, and corresponding occasionally both with the class of ornament exhibited on Chinese and Japanese work, and with that found on the carved woodwork of aboriginal races. The most agreeable contrasts of colour in these manuscripts are those of purple with yellow. Considerable life and distinctness was given to combinations of ornament by enclosing the bounding lines with closely-serried minute red dots. Although small, one of the most elegant of all the Irish volumes is that known as the Gospels of McDurnan, preserved in the library of the Archbishop of Canterbury at Lambeth.

It is exceedingly difficult to predicate with any certainty as to the relative ages of the various specimens of Irish illuminated MSS. which still exist; as, although some are ruder than others, there is scarcely any alteration in the system of ornament, or the representation of animated objects, to be recognized in the whole series. How profoundly they were admired in the Middle Ages is testified by several citations given by Mr. Westwood; the most interesting perhaps being that of Giraldus, written in the twelfth century. That author describes a book which he saw at Kildare, said to have been written by St. Bridget, who died A.D. 525, and concludes what Mr. Westwood calls his "flaming account" of it by stating that "scarcely could Apelles himself execute similar works, which appeared to have been formed and painted by some scarcely mortal hand."

From the monastery of Lindisfarne, to which I have already alluded, the arts taught in the schools of Ireland were communicated to various English monastic institutions, and more particularly to that at Glastonbury. How completely identical the practice of the scribes, both Irish and Anglo-Saxon, who exercised their art at Lindisfarne was with those of Ireland itself, may be clearly traced by a comparison of books known to have been illuminated in Ireland, with such works as the Durham Book, or Gospels of St. Cuthbert, and others which we cannot doubt were executed in this country.

The last-named volume, which is probably the most remarkable MS. in the British Museum, is of world-wide celebrity. St. Cuthbert died in the year 698, and by way of a memorial to him, his successor, Bishop Eadfrith, caused this noble volume to be written. It was greatly enriched by Ethelwald, Bishop of Lindisfarne, who succeeded Eadfrith in 721. This prelate caused the book to be richly illuminated by the hermit Bilfrith, who prefixed an elaborate painting of an evangelist to each of the four Gospels, and also illuminated the capital letters at the commencement of each book. The bishop caused the whole to be encased in a splendid binding of gold, set with precious stones; and in the year 950 a priest named Aldred rendered the book still more valuable, by interlining it with a Saxon version of the original, which (unlike the more ancient Irish MSS.) was in the Latin text of St. Jerome. In the diagrams on the wall I exhibit to your notice various ornamental features from this extraordinary book, some drawn to the exact size of the original, and others magnified so as to enable you to perceive the general characteristics of the style from a distance.

The preservation of this most elaborate volume is of the highest importance, as showing that, for at least 100 years after the advent of St. Augustine in this country, the Irish style of illumination was adhered to in the north of England by Anglo-Saxon students; and that very few traces were manifested of those changes in style which were unquestionably introduced through the admiration excited by the comparative pictorial excellence of the illuminated books known to have been brought by the envoy of Pope Gregory the Great into this country in the year 597.

These books are known to have consisted of a Bible in two volumes; two Psalters; two Books of the Gospels; a Book of Martyrology; Apocryphal Lives of the Apostles; and Expositions of certain Epistles and Gospels. The Bible, which was beautifully written on purple and rose-coloured leaves, with rubricated capitals, with portions in gold and silver, was certainly in existence in the reign of James I. Some of the learned think that this original Gregorian Bible may be traced in the magnificent purple Latin Gospels of the British Museum (Royal Library, 1. E. 6); but a careful examination will, I think, suffice to establish the presence in that volume of features so decidedly characteristic of Anglo-Saxon work, as to render it exceedingly unlikely that the volume could have been written anywhere but in this country. There can be little doubt, however, that if not the identical volume, it was one of the earliest transcripts made from it; and probably under the superintendence of St. Augustine himself. In this book of the Gospels the execution of the figures is entirely different from that commonly practised by the Irish scribes. There is an attempt at shading, and there is a sketchiness of touch which appears to me to clearly indicate the attempts of an artist, accustomed only to the use of the pen, to copy the touches and effects produced by means of the brush.*

* To be continued.

ON THE DISCOVERIES OF THE BUDRUM EXPEDITION.

THE concluding lecture at the Architectural Exhibition, delivered by Mr. R. P. Pullan, on the 5th inst., was on the "Discoveries of the Budrùm Expedition." The subject has been treated of on various occasions in our pages, but the following portions of the paper will be found to convey additional information.

It was reserved for the Budrùm expedition, under Mr. Newton, to be the means of adding to our national collection the finest sculpture it possesses, after the Elgin marbles. This gentleman united to the necessary qualification of being a scholar, that of being imbued with an enthusiastic love of Greek art, and what is of more consequence to the leader of an expedition, he possessed a thoroughly practical turn of mind and great administrative talent, for it is not only the acquisition of antiquities he has to consider, but the daily requirements of those united under his charge.

Mr. Newton had been appointed vice-consul of Mitylene, by Lord Granville, in order that he might have the opportunity of exploring the neighbouring coast, and that he might turn to the national advantage any discoveries that might there be made. After a residence of a few years, which enabled him to master the language and become acquainted with the customs of the people amongst whom he dwelt, he turned his attention to an object that had always been the nearest to his heart, viz., the discovery of the sepulchre of Mausolus, king of Caria—one of the seven wonders of the ancient world, the exact site of which had never been determined, though several had visited Budrùm for the purpose of ascertaining its exact position.

The expedition reached Budrùm on the 22nd November, 1857, and here, perhaps, it would be as well for me to describe the beautiful spot at which they arrived, which was to be for a year the scene of their labours.

The city of Halicarnassus, now Budrùm, was situated on the shores of a bay curved in the form of a horseshoe, on ground gradually sloping up to rocky mountains, which lay about a mile from the shore, and the lower parts of which were included in the circuit of the walls. The city was built on terraces, formed by low walls, which prevented the alluvial soil washed from the hills from being carried away. The hills encircling the bay gave the ancient city the form of a theatre, and in this respect it resembled Rhodes: possibly it was laid out by the same architect, Hippodames, who is known as an architect of cities. The bay was divided into two equal parts by a rocky promontory, upon which stood the palace of Mausolus, where now the castle is situated.

Of the several travellers who visited Rhodes, two only have indicated the precise spot upon which they surmised the Mausoleum to have been built,—Captain Spratt, who made a plan of the town when surveying the coast for the Admiralty; and Ross, a German architect.

According to the description of Vitruvius, it stood in a broad way at the centre of the town. Both these sites have a central situation; and, from these being the only large level platforms perceptible in the centre of the town, they seemed likely to afford ground for the hypothesis. Mr. Newton explored Spratt's platform first, and found nothing but Byzantine walls, probably those of a monastery. Ross's platform was afterwards excavated: it turned out to be the site of the Temple of Mars. Mr. Newton then began to dig in a field belonging to Hadji Captan, where a fine statue of a female had been found. In this field were found the foundations of a Roman villa, and several mosaic pavements of rather coarse workmanship. These were carefully raised, packed, and put on board ship, precaution having been first taken to photograph them all while *in situ*—a most difficult operation, as you may imagine, as a scaffold had to be erected, and the camera arranged with the lens downward. This operation was, however, successfully concluded by the two photographers of the expedition, Corporals Spackman and Macartney.

During the excavations of the villa Mr. Newton, in exploring the neighbourhood, discovered some remains of columns and other fragments of a fine Ionic building, built into the walls of houses and vineyards, on a spot mentioned many years ago by Professor Donaldson as the probable site of the Mausoleum. Excavations were commenced here on January 1st, 1859, and in the course of a few days Mr. Newton had the satisfaction of ascertaining that he had attained the object of his search—the site of the Mausoleum,—for fragments of

friezes were soon brought to light, corresponding in style and in dimensions with those which had been removed from the castle of Budrùm, which was known from records to have been built out of the ruins of the Mausoleum; and shortly afterwards parts of two colossal horses were discovered, and then numerous pyramid steps, which proved without doubt that these were the ruins of the building described by Pliny as having been surmounted by a pyramid of twenty-four steps, crowned by a quadriga.

There were several obstacles to the rapid progress of the works. One of these was the difficulty of purchasing the houses and gardens that covered the site. These had to be purchased one by one, and were only parted with by their proprietors on condition that the excavation should be filled up, so that they could build anew on the same sites. The natural cupidity of the Turks was excited: they imagine all Englishmen to be mad; but they considered it an incredible degree of insanity for men to spend thousands of piastres and so much time and labour simply for the sake of a few *eski tashler* (old stones), even though they might be *yazli tashler* (inscribed stones), or *marrowfat tashler* (wonderful sculptured stones). No! we must know of some concealed treasure; and had not they or their friends discovered coins in ancient tombs before now? Were not they themselves in the habit of burying their treasure in times of tumult, not knowing what else to do with it?—and as we had not yet discovered this buried treasure, was it not likely that it might be under their own houses? So they asked fabulous prices for their miserable little tenements, hardly better than cowsheds; and it was only by a series of clever negociations that Mr. Newton was enabled to secure them. Even to the last there were two houses left unbought within the peribolus on the south side; but they were tunnelled under in every direction, without any trace of sculpture being discovered.

At length a sufficient space of ground was excavated to show a quadrangular cutting in the rock, 126 feet by 110, which would give ample space for a building the circumference of which was 411, according to Pliny, to stand within it. This area was partly filled with blocks of green rag, laid in regular courses of a foot in depth. This formed the core of the stylobate, which must have been of great height and solidity, for a great part of the ancient castle of Budrùm is built with these courses of green rag, of uniform height, taken from the Mausoleum. Pliny's description of the monument is, no doubt, familiar to you: he gives the total height of the structure, including the quadriga, as 140 feet. He mentions that the *pteron*, or colonnade, was raised to the height of 25 cubits (37½ feet), and that the pyramid was of the same height; so that the stylobate would have been 65 feet in height. I may mention that this high base is not unusual: it occurs at the Ionic monument of Xanthus, and in other tombs of this class.

We found the order to be fine Ionic, resembling in proportions the temple of Minerva at Priene, and that its height came out about the same as that given by Pliny—viz., 37½ feet. The pyramid steps found on the north side and near the peribolus wall (which they had struck in falling, and made to bulge outwards), were of two dimensions, as to the treads, viz., 1 foot 9 inches, and 1 foot 5 inches, the riser being uniformly 11¾ inches. One step was found with a 9-inch tread.

The chariot was by Pythis, the frieze by Scopas, Timotheus, Leochares, and Bryaris, the first sculptors of their day. In addition to these fine sculptures were found some magnificent lions, an equestrian figure, two sedent figures, and heads and pieces of several others, all in good style.

I will not now go into the question of the restoration. This, as you know, has been a *questio vexata* for a long period. It would be unfair to criticise the various restorations that were put forth (before we had any data to go upon) based upon Pliny's description, which it is so difficult to reconcile. I may mention that the whole question mainly depends upon whether the 63 feet given by Pliny as the length of the sides, in contradistinction to the fronts, refers to the cella, or to the *pteron* or colonnade. Count Caylus was one of the first to make a restoration, and his conception of it was unlike anything that has subsequently appeared. This was followed by those of Texier, who supposed it to have been circular, those of Rosse, Professor Cockerell, and Mr. Watkins Lloyd. In Mr. Falkener's "Museum of Classical Antiquities," will be found a complete report of these various restorations which are all to a certain extent to be reconciled with Pliny.

I may mention that the mode of restoration proposed by Mr. Fergusson (in the *Builder*), explains a passage in Pliny before lost sight of, in which he says that the pyramid contracts in the form of a goal, which would give it a curvilinear form. In Mr. Newton's book on the "Expedition," I hope to be able to put forth a restoration in which most of the points are met: at present I am waiting to hear the result of the collation of the various manuscripts of Pliny which is being done by Mr. Newton's direction.

Besides the Doric colonnade, which stood in front of the temple of Mars, there is nothing of the ancient city remaining above ground but the theatre and the city walls. The theatre is situated, as is almost universally the case, on the side of a hill, so placed that the spectators might, between the performances, gaze upon nature's own scenery, painted in her most brilliant colours. Opposite them, at a distance of twenty miles, could faintly be distinguished the promontory of Cnidus; a little nearer, the jagged peaks of the Cos mountain called Prion, from its saw-like appearance; while the magnificent panorama of the city lay immediately beneath them, the palace of Mausolus and the temple of Venus occupying the two horns on each side of the bay, and the magnificent sepulchre of Mausolus rising in the centre to the height of 140 feet, of Parian marble, brilliant with gold and colours, and surmounted by the four-horse chariot containing the colossal statue of the departed monarch.

In October, 1857, as the excavations did not require his immediate presence, Mr. Newton took advantage of the return of the *Supply* to Malta to visit the temple of Apollo at Branchidæ, the modern Greek name of which is Gerouta, near the ancient city of Miletus. He was induced to make this excursion for the purpose of endeavouring to find certain statues that lined the sacred way approaching this celebrated temple, which was the seat of one of the greatest oracles of antiquity. There is a vignette in the "Ionian Antiquities" showing a group of these figures, and from this it was evident that they were of an archaic style, of Egyptian character, and therefore valuable to the historian of art as the connecting link between Egyptian and Greek art. He found eight sedent statues of regal personages in their original positions, but buried up to the neck: most of the heads had been knocked off. Upon digging round the figures, inscriptions of an interesting sort were found, some of them in the boustrophedon or earliest character known—that is to say, running from right to left and then from left to right, as an ox ploughs; hence the name; in addition to which he discovered a lion and a sphinx, and on the former the name of Thales, the Greek philosopher, who flourished in the year 560 B.C., in the neighbouring city of Miletus. The temple had been so thoroughly illustrated by the Dilettanti Society that it offered nothing new. Upon it being represented to the Government that these eight figures were worthy of transportation to England, money was liberally granted for the purpose, and some months afterwards the *Supply* again touched at Branchidæ, and by the efforts of the crew these large sculptured blocks were dragged down to the shore, and safely shipped. They are now in the Cnidus gallery of the Museum.

In the summer of 1857 Lieutenant Smith, taking with him a photographer and some Turks, made an excursion to the ruins of a temple at Lagina, which was not known to any former traveller, a city a little north of Stratonicæa, and was known to Pococke under the name of China. We found amidst the thick underwood several fine friezes of Roman temples, of which photographs were taken: the peribolus gateway was standing, but the rest of the structure, which was of the Corinthian order, was in ruins. The friezes were unfortunately too far from the coast for removal, being four or five days' journey by an impracticable road—that is to say, impracticable for sledges.

Lieutenant Smith also explored the shores of the Gulf of Keramo, and visited the city of that name, which had been identified by the surveyor of the Admiralty. He found there a city of the first class, that is, one that had not been built upon after Roman times.

In November, 1857, I started for the purpose of exploring the island of Cos, taking with me a photographer (Corporal Spackman) and two Turks. The island had been visited by Colonel Leake and by Rosse; but it was thought that there might be sculpture or architectural remains that had escaped their notice.

In the well of Hippocrates, about four miles from the city of Cos, is an example of horizontal arched vaulting, the only one I know of besides that of the treasury of Atreus. This well is in the side of a hill, about 20 feet beneath the ground, and is approached by a subterranean passage: it is about 10 feet in diameter, and 18 feet high: the vault is of beehive form.

At Pylia we found the Charmyleion, a monument of the kind called Heroön, consisting of an oblong chamber, with an arched roof, niches for the dead being at the sides. The Ionic ornaments of the façade were found in the façade of a neighbouring church. We visited the site of Astypalœa and Halasarna, which possess but few fragments of buildings. We brought back copies of many inscriptions inedited.

In December Mr. Newton and myself, accompanied by a body of marines, were landed on the barren peninsula, at the extremity of which is situated the city of Cnidus: this peninsula, 120 miles long, by from 3 to 4 miles broad, is bounded on the sides by the Gulf of Doris and Keramo. A high mountainous ridge, with one or two breaks in it, runs the whole length of the peninsula. At the extreme point are the ruins of a city built on the side of a mountain. The forms of the temple, theatre, and other public buildings, can be accurately distinguished, and are shown with great exactness in the map published in the second volume of the "Ionian Antiquities," and in the excellent survey by Captain Graves.

The Triopian promontory, about a mile long by a quarter of a mile broad, is joined to the main land, near the middle of its length, by a narrow sandy isthmus. Its natural harbours were formed in this manner: massive walls and piers were erected round them, which still remain. As there were no houses, however, within six miles of the city, the marines were employed for some time after our landing, in erecting the Crimean huts, for the accommodation of the expedition, which had been sent out from Malta on board the *Supply*.

In a short time a little settlement arose, formed of huts arranged in a quadrangle: a pier was constructed for the embarkation of antiquities: a tank was sunk for the preservation of water, which was scarce: and by Christmas-day everything was ready for the commencement of excavations. Our first trial was at the celebrated temple of Venus. The architecture of the temple (which is thoroughly illustrated in the "Ionian Antiquities") was found to be, though elaborate, late and of Roman character. Beneath the foundations we found fragments of cornices, which induced us to suppose that there had been an earlier temple in a purer style; but we found neither inscriptions nor sculpture.

The vestibule of the theatre next engaged our attention. Here we found Corinthian capitals, bases, and several fragments of thin marble, showing that the interior had been veneered after the manner of the Palace of Mausolus, as mentioned by Vitruvius.

The first important discovery was the tomb of Lykœthius on the Triopian promontory. This had been a Roman tomb, also Corinthian, with two columns *in antis*. The vault had been circular. Three sarcophagi of late workmanship were found *in situ*, and a statue of Demeter that had been in a niche at the side. Some valuable inscriptions were found that had lined the walls.

The finding of a statue figure on a terrace near the city walls induced Mr. Newton to dig in the vicinity, and he found that on this terrace had been a *temenos*, or sacred inclosure for interments, dedicated to Demeter. Here was brought to light a fine head of Proserpine, a small Venus, hundreds of lamps of terra-cotta, and also fragments of fine sculpture.

Before coming to Cnidus Mr. Newton had heard of a lion upon some promontory near. I had also received information from a shepherd that upon the top of a hill was a figure like a demon. When the weather became favourable for exploring, I went in search of this demon, taking with me two sappers. On the second day of our search, upon the top of a promontory not easy of access, I had the good fortune to come upon a magnificent lion, lying on his side in hollow ground. He measured 10 feet long and 6 feet to the top of his head, being represented in a recumbent posture. As soon as this discovery was made known to Mr. Newton, he directed an encampment to be formed on the spot. Lieut. Smith set the sappers to work to construct a zigzag road (for the cliff upon which the lion stood was some 200 feet above the level of the sea) for the purpose of embarking it; and in a few weeks' time the monster was hauled up by means of shears and a powerful winch, put into a strong oak case, dragged down the road by 120 Turks, at the rate of about 100 yards a day, and at last shipped by the sailors amidst the united rejoicing of Turks and Englishmen.

While this was being done the tomb upon which the lion formerly rested was carefully removed. That portion which remained standing was a core of petrified beech—a stone common in that country—circular in the interior, of the diameter of 17 feet 6 inches, and externally forming a square of 40 feet. In the thickness of the walls were eleven recesses for the reception of bodies, and a low entrance.

The casing, which was of a local marble, had been detached and overthrown, and the stones separated for the sake of the metal cramps. The tomb had been surrounded by engaged columns of the Doric order, resting upon a stylobate. Above this had been a pyramid of steps, and, to crown all, a high plinth, surmounted by the lion. The whole must have formed a conspicuous landmark for mariners, and probably was the original Cnidian lion which we find on the coins of the city, and was, no doubt, one of the most imposing monuments of the country. The work had never been quite completed, as the lions' heads on the cornice were left in block, and the columns unfluted, as at Rhammis and Delos. There was, however, sufficient *matériel* to enable me to make a restoration of the tomb. Other discoveries of sculptures were subsequently made.

In conclusion, I may say to the student of art, who to an appreciation of antiquities unites a love of exploration and something of the spirit of adventure, that there is no country that will so well repay the toil of travel as Asia Minor: there he will find that which will compensate for the dangers of an excursion amongst lawless people—and these are not few—and for the inconveniences of a hot climate, and these are many. In the course of every day's journey he will meet with, perhaps an inscription, perhaps a ruined temple, or perhaps a decayed city, abounding with ruins of theatres, temples, palaces. Here he may pitch his tent in the centre of some vast theatre, and for days find interest in exploring and measuring the ruins; or he may be still more fortunate and discover among the brushwood, or half buried in the ground, some wonderful work of art, a frieze, or a statue of Praxiteles, or some of his pupils. This may be the case even in a place so much exposed and so frequently visited as Cnidus. One day Mr. Newton and myself were walking in the outskirts of the city, and near the outer wall we observed a piece of white marble protruding. The surface had been broken off, but on removing a little of the earth we discovered folds of drapery: the Turks were summoned to dig, and in a short time a fine colossal seated figure was disinterred, which is now in the British Museum. Should the traveller not be so fortunate as to bring to light any fine sculpture, he may still be lucky enough to discover some city site, which was unknown before, from inscriptions or coins to identify it; thus adding considerably to our historical knowledge. He may bring home drawings of ancient remains that have never been represented by the architectural draughtsman.

Not one of the ancient cities of Asia has yet been properly explored, and those that have been visited have, with few exceptions, not been illustrated; so that the field of labour is vast, the difficulties not great to an enthusiastic man, and the reward and satisfaction so great as only to be appreciated by those who have experienced it.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE closing ordinary general meeting of the Royal Institute of British Architects was held on Monday evening last, at the house in Conduit-street; the President, C. R. Cockerell, Esq., in the chair.

Mr. Lewis (honorary secretary) read a letter from Mr. Quarm, clerk of the works at the new palace of Westminster, acknowledging the vote of thanks which had been passed to the men who had assisted at the funeral in Westminster Abbey of the late Sir Charles Barry.

Mr. Lewis also read the draft of a memorial from the council and members of the Institute to the dean and chapter of Worcester Cathedral, praying them not to demolish the famous Guesten Hall; which is one of the finest examples remaining of the building of the Decorated period.

Mr. James Bell (honorary secretary) having read a list of donations,

The President, in moving that the thanks of the Institute be awarded to the donors, announced that a special general meeting would be held on Monday next, to consider the proposal of the council as to architectural examinations. He was sure that all present would agree with him that this was a subject of great importance to the profession; for if there was anything which could add more to its respectability and status, it would be the institution of the proposed examinations. He hoped, therefore, that there would be a full attendance of members, so that the subject might be fully discussed.

Mr. Bell next read a paper forwarded by Sir Gardner Wilkinson "On the use of Granite." This will be found on the present page.

Thanks having been voted to Sir Gardner Wilkinson for the paper,

Mr. Digby Wyatt read a paper on "Illuminated Manuscripts as Illustrative of the History of the Arts of Design," the commencement of which we print elsewhere.

At the conclusion,—

Mr. Burges observed that some time since he had met in Theophilus a recipe for dyeing the ivory knobs of bishops' croziers, and he had made an experiment in order to see whether the materials would do for colouring vellum. The principal substance was rose madder; and he found on steeping the vellum in it for about a week that it produced a most beautiful and brilliant colour. He saw no reason why the service books in our abbey churches should not be illuminated. It seemed to him that if a memorial of a good and distinguished person were required, it would be far better to produce a magnificent illuminated volume than an ugly bronze statue, which in a few years would become as black as a sweep. Just fancy what a magnificent Book of Common Prayer might be produced for Westminster Abbey if Mr. Dyce and Mr. Herbert were commissioned to illustrate it.

Mr. Wyatt observed that the gorgeous purple colour found in ancient manuscripts was produced from madder. The Greeks had a plant which grew near Athens, which they called *folium*, and which they used for illuminating purposes. This plant was mentioned by Theophilus.

Mr. Burges said Theophilus called the substance madder.

Mr. Wyatt observed that the ancient scribes covered the surface of their paintings with albumen, or the white of eggs, to preserve them from the action of the atmosphere.

Mr. Lewis said he had followed the recipes left by Theophilus for producing the gold effects, but that he had not succeeded to his satisfaction. He would be glad to know whether Mr. Wyatt had, in the course of his research, been able to throw any light upon this portion of the subject.

Mr. Wyatt replied that there were many treatises on the art of illuminating, which contained particulars about the preparation of the gold process, but he was free to confess that he had not been able to make any of them work. He believed that white of egg mixed with plaster of Paris, as used by the ancient Italian illuminators, was the best groundwork for gold.

Mr. Burges said he had no doubt but that the problem could be solved, if the demand for illuminated books were revived. He believed the ancients had two ways of laying the foundation for thin gold—a gesso ground and an opaque ground. In the gilding of picture-frames, a ground of whiting and size was used, then burnishing gold size mixed with common size, and then a wash of water. The best success which he had met with was to take common burnishing gold and apply until a raised surface was obtained; then rub down with a brush, and afterwards apply shell gold or gold powder. Some years ago a man named Hewitt, who worked at the British Museum, was enabled to produce a very fine gold burnish, which he made a great mystery of. He said it consisted of three vegetable extracts, but the mark being rather wide, he contrived to keep the secret to himself.

Mr. Reynolds Rowe (Cambridge) said that perhaps a clue might be afforded to the wonderful excellence of the ancient illuminated manuscripts, by the fact that they were not executed by contract.

Mr. Wyatt said that, unfortunately for the force of Mr. Rowe's argument, there was abundant evidence to prove that many of the manuscripts were executed by contract. In the rolls of York Minster there were several entries showing how a certain accomplished scribe had contracted to execute illuminations for all the Psalms, with azure and vermilion, at 5s. 6d. each.

On the motion of Mr. Kerr, a vote of thanks was unanimously awarded to Mr. Wyatt for his paper.

The President expressed a hope that the paper would be published, in order that it might become of practical service to the members of the Institute as architects, and assist them to get rid of the white and grey surfaces so apparent in the interior and exterior of modern buildings. He had himself seen that day a beautiful work which wanted nothing but the pencil of the artist to make it perfect. Strangers conversant with Continental buildings were surprised that we had not made more way in this peculiar style of decorative art.

The Right Hon. the Earl de Grey and Ripon was, on ballot, elected an honorary fellow. The following gentlemen were elected Fellows: Mr. Edward Middleton Barry, Associate, of 1, Old Palace-yard; Mr. George Low, Associate, of 10, Basinghall-street, City; Mr. Thomas E. Knightley, Associate, of 25, Cannon-street, City; Mr. Octavius Hansard, Associate, of 11, Argyll-place, Regent-street; Mr. Frederick H. Pownall, Associate, of 15, Gower-street, Bedford-square; and Mr. C. F. Reeks, Associate, of 12, Middle Scotland-yard. Mr. Louis De Ville, of 36, Great Ormond-street, and Mr. Thomas Tod Mardon, of 6, Great James-street, Bedford-row, were elected Associates.

ON THE USE OF GRANITE.

As the question of using granite for building and monumental purposes has been much discussed, I beg to offer a few remarks connected with it, and to notice a fact which shows at how early a period the ancient Egyptians had watched the effect of atmospheric and other influences on stone, and how wisely they profited by the lessons taught them by experience. They had learnt that earth, abounding with nitre, from its attracting moisture, had the effect of decomposing granite, but that in the dry climate of Upper Egypt the stone remained for ages uninjured when raised above all contact with the ground. When, therefore, there was a possibility of its being exposed to damp, they based an obelisk, or other granite monument, on limestone substructions; and these last are found to the present day perfectly preserved, while the granite above them gives signs of decay in proportion to its contact with the earth subsequently accumulated about it. I am speaking of Upper Egypt, visited only four or five times in a year by a shower of rain; for in the Delta granite remains have been affected in a far greater degree than in the Thebaïd. Nitre abounds there, and it is remarkable that the obelisks at Alexandria have suffered least on the sides next the sea.

The Egyptians seldom used granite as a building stone, except for a small sanctuary in some sandstone temple; and in the later times of the Ptolemies one or two temples were built entirely of granite. But in the pure Egyptian period that stone was chiefly confined to the external and internal casing of walls, to obelisks, doorways, monolithic shrines, sarcophagi, statues, small columns, and monuments of limited size, and was sometimes employed for roofing a chamber in a tomb.

The durability of granite varies according to its quality. The felspar is the first of its component parts which decomposes, and its greater or less aptitude for decay depends on the nature of the base of which the felspar consists. Egypt produces a great variety of granite, and the primitive ranges in the desert, east of the Nile, about 35 miles from the Red Sea, supplied the Romans with numerous hitherto unknown kinds, as well as with porphyry, which they quarried so extensively in that district; but the granite of the ancient Egyptians came from the quarries of Syene, in the valley of the Nile, and from these they obtained what was used for their monuments. It is from this locality that the name of "Syenite" has been applied to a certain kind of granite: it is, however, far from being all of the same nature, and a small portion of the stone found there is really what we now call "Syenite."

Already, at the early period of the third and fourth dynasties, between twelve and thirteen centuries before the Christian era, the Egyptians extensively employed granite for various purposes. They had learnt to cut it with such skill, that the joints of the blocks were fitted with the utmost precision. Deep grooves were formed in the hard stone with evident facility; and it must have been known to them for a long period before the erection of the oldest monuments that remain—the Pyramids of Memphis, where granite was introduced in a manner which could only result from long experience. Again, in the time of the first Osirtasen, about 2050 B.C., granite obelisks were erected at Heliopolis, and in the Fyoóm, and other granite monuments were raised in the same reign at Thebes; from which we find that even then the Egyptians had learnt how the damp earth acted on granite when buried beneath it; and this interesting question subsequently sug-

gests itself—how long before that time must the stone have been used, to enable them to obtain from experience that important hint which led them to place granite on limestone substructions?

I have already had occasion to offer some remarks on the mode of treating granite surfaces, which has been so ably detailed by Mr. Bell, at the meeting of the Society of Arts (March 14); and I have stated that the Egyptians adopted the broad character of ornamentation in sculpturing granite very judiciously advocated by him. I will, therefore, only add, that other good examples of such treatment may be found in early crosses of Cornwall, Devonshire, and other localities in this country; where what has been (rather hastily) called the Runic knot,—a design of entwined basket-work, common also in Italy, and other countries,—the large scroll pattern also frequently met with on the same monuments, and numerous massive ornaments in relieved intaglio, cut in the thickness of the stone, are instances of a style of decorative sculpture admirably suited to granite. GARDNER WILKINSON.

CONSTRUCTION OF BREAKWATERS.

INSTITUTION OF CIVIL ENGINEERS.

ON May 22nd the paper read was, "On Breakwaters," by Mr. Michael Scott.

This communication was in continuation of a former paper, read in December, 1858. It consisted of two parts,—the first being an account of the completion of the Blyth breakwater; the second, a description of a new kind of breakwater.

It was stated that, since the date of the former paper, the breakwater at Blyth had been completed with entire success, notwithstanding a cross current of 3½ miles an hour. Having been exposed to the violent storm of October last, without sustaining the least injury, it was claimed that experience had afforded a complete answer to the objections made, during the previous discussion, to this kind of breakwater, which consisted of timber-frames, deposited in deep water, planked and filled with stone.

The cost of the breakwater, including the round end and the light-house, was stated to have been 11*l.* per lineal foot. Four years' experience had shown that properly creosoted timber was not touched by the worm.

The new kind of breakwater was a modification of the wave screen described in the former paper. Although similar in principle, it differed in the materials of which it was constructed, and it was applicable to deep water. It was proposed to deposit a bank of rubble stone, up to the depth, below low water, at which stone began to be disturbed by the action of the waves. Upon this bank would be built a face wall, up to the low water mark, and behind this wall long counterforts, the upper surface of which would rise from low water at an inclination of say 2 to 1, and extending back for a distance dependent upon the extent of the slope rendered necessary by the magnitude of the waves. These counterforts would be so far apart from one another as could be conveniently spanned by iron girders, suppose 20 feet; and the whole of the sloping surface would be converted into a sort of gridiron by girders laid from counterfort to counterfort at distances of about 18 inches apart. Supposing such a breakwater to be exposed to a heavy sea, whether the waves were breaking or not, the water would be projected up the slope, and would gradually drop through on its passage.

The paper "On the Method of Computing the Strains and Deflections of Continuous Beams, under various Conditions of Load," &c., by Mr. J. M. Heppel, was stated to be of so purely mathematical a character as to be unsuited for reading. It would be published in the Minutes of the Proceedings.

OUR ARCHITECTURAL ANTIQUITIES.

THE GUESTEN HALL, WORCESTER.

IT is to be hoped that the stir that has been made may serve to save this valuable relic of the Middle Ages from the destruction threatened by the Dean and Chapter of Worcester, or the Ecclesiastical Commissioners. We early protested against the threatened Vandalism, and since then other metropolitan papers have taken up the matter. The Society of Antiquaries have sent a memorial to the Dean and Chapter, showing reasons for its preservation. The Institute of Architects (as elsewhere mentioned) have also sent one, signed by the president, vice-presidents, council, and many of the members; and the same course has been pursued by several other bodies. It is perfectly preposterous that any such interposition should be necessary. The last statement, which we owe to Mr. A. B. Hope, is to the effect that the contemplated proceedings, which have so justly caused apprehension, are to be limited to clearing out the modern partitions and fittings which now clog the building; and that no order has been given to destroy the old work.

That gentleman adds,—"The satisfaction which this assurance would have created is, however, greatly mitigated by one of my informants having added the expression of his fears that the building, thus relieved of the cross walls which now keep it up, may come down with a run."

Let us hope soon to hear that proper professional advice has been taken, and that this interesting structure will be put into a state to withstand the operations of time for many years to come, and be appropriated to some fitting and useful purpose.

We have received several letters on the subject, and give part of one which refers to the general question of the preservation of our architectural antiquities.

It seems to me very desirable that some measures of a permanent character should be taken, in order to save buildings of architectural and archæological interest from the hands of such ruthless spoilers. This might be effected by a joint action of all the British societies. I would, in the first place, propose a central committee in London, at whose office the name of every society throughout the country should be registered. Each society thus registered should either elect a special sub-committee attached to its own body, for the preservation of objects of interest, or should act as a body in this capacity. When any such object is threatened with destruction, decay, or dilapidation, it should be the province of the local sub-committee to report the facts concisely to the central committee, with the best means that appear evident to the sub-committee for its preservation. The central committee should then print a short statement of the facts, and send it to every local society registered on its books, with a request that the members would take such measures, and hand in such subscriptions, as they might be able to obtain. By this means, I am convinced, money might be raised, and antiquities, otherwise doomed for want of sufficient local funds to purchase or repair them, might be saved. It would also be a means of spreading widely a knowledge of such remains that otherwise would have only a local fame. Such an organization would have saved the noble gateway recently destroyed in York: it might now be in operation to save the Guesten Hall, and it would in all such cases give unity and force to protests against Vandalism, that are now weak and ineffectual by their want of a common centre. E. W. C.

THAMES EMBANKMENT COMMITTEE.

THE committee continues its sittings. On the 15th, Sir Joseph Paxton in the chair,—

Mr. G. P. Bidder said that he was President of the Institution of Civil Engineers, and had turned his attention to the question of the embankment of the river Thames, and to the subject of the construction of a low-level sewer running in the direction of the Strand and Fleet-street. The plan now before the committee contemplated to obviate the difficulties of such a construction, and at the same time by an embankment of the river to improve the access from the West-end to the City. The proposed embankment would leave New Westminster-bridge on the level, and proceed to Whitehall-place on a low level, so as not to interfere with the mansion residences on Richmond-terrace and Privy-gardens. It would so proceed until it approached Hungerford-bridge, which was about to be converted into a railway bridge, which it would pass under, and then rise at an easy gradient with an embankment 5 feet above Trinity high-water mark to the level of Waterloo-bridge. Thence it would proceed to Blackfriars on a level, and on to Southwark-bridge, where it would end. At Hungerford it was proposed to construct a dock of five acres for the accommodation of the existing traffic there in the hay and straw trade, and along the line of route the plan was so designed as not to interfere with the premises and wharfs on the northern bank of the river. On the embankment, besides the roadway and footpavement, it was proposed to construct a double tramway for omnibuses drawn by horses to run between Westminster and Southwark bridges. The time that would be required for the construction of the works would be between three and four years. He considered that the Metropolitan Board of Works might fairly contribute towards the work 250,000*l.* on behalf of the metropolis, for the accommodation it would give to the construction of the low-level sewer and a roadway 100 feet in width. If the low level is carried out the estimate was 50,000*l.*, but there would be loss occasioned by persons being obliged to close their shops for months together. It was believed the total liabilities for the construction of this sewer would not be far short of 240,000*l.* The circumstances on the south side of the Thames were entirely different, as they would not require a roadway there. He estimated the cost of the works contemplated on the north bank between Westminster and Southwark bridges, including the construction of the embankment-wall, the dock, and roadway on arches, as shown in the plan exhibited, but irrespective of compensation, at 1,500,000*l.*

On the 19th instant, Mr. Gisborne, civil engineer, was examined. He stated that he had executed works on the River Shannon to the extent of 800,000*l.*, and had conducted other extensive works in connection with embankments and other works in which the foundations had to be made under water. He had also paid considerable attention to the subject of the embankment of the Thames, and had submitted plans to the Government. He proposed to create a quay-wall from Westminster-bridge to St. Paul's-wharf. Under the quay-wall there would be tidal basins with numerous entrances, having headways varying from 13 feet to 18 feet. There would be then a roadway of 70 feet, and an esplanade of 20 feet wide, raised on iron columns and supported upon an iron viaduct. The roadway would be narrowed from Hungerford to Paul's-wharf, along which, except in front of Somerset House and the Temple Gardens, houses, shops, and warehouses, would be built, and would increase remuneration, as he would subsequently show. He had intended also to construct a railway from Hungerford to London-bridge, but he confessed he had been obliged to abandon it in consequence of the amount of compensation that would be required. The roadway would be carried on from Paul's-wharf to Fishmongers' hall. The estimates for the works on the north side was 953,869*l.*, to this he added 100,000*l.* for compensation to persons for temporary losses during the progress of the works, and adding to this 10 per cent. for contingencies, raised the total estimate for the north side works to 1,281,000*l.* On the south side he proposed to carry out works on the same principle, by the construction of a quay wall, with tidal basins inside. The total estimate for both sides of the river was 1,900,000*l.* By this plan, and by railway foundations above the high-water mark, there would be obtained 315,000 superficial feet which could be sold or let out for building purposes; on the south side there would be obtained 499,500 superficial feet, making 814,500 superficial feet. He had valued that land at 1*l.* per foot, representing 814,500*l.* In addition to this, he should have 400 cellar wharfs on the Middlesex side, for stowing coals, straw, and other commodities, and 300 similar cellar wharfs on the Surrey side; and these he calculated would be worth 750,500*l.*, so that the total calculated remuneration was 1,564,000*l.*, leaving about 336,000*l.* to be provided.

Captain Morgan was next called, and informed the committee that he had formerly been superintendent of the London Docks, and gave evidence with respect to his experience of the effect of narrowing the river with regard to the tidal supply of water to those docks. He considered that an embankment was prejudicial to the navigation of the river.

UNHEALTHY HOUSES.

SIR,—Perceiving a paragraph in the *Builder* of last week, cautioning the public as to the ill drainage of dwelling-houses in the event of a sudden change of the weather, will you permit me to ask what steps it is advisable for me to take under the following circumstances:—

I have hired a cottage for a term; have a family of six children (delicate). I find, now that I have got in, the drains are in a horrifying condition; the stench is intolerable; the rats running about like bees; not a drop of water, except rain-water; my liberal landlord refuses to lay out a fraction, or to release me from the house, adding, that if I (as I have threatened) refuse to pay the rent, he will immediately distrain. I am a working man with a large family, and limited income, and took the cottage for the benefit of country air for my children, at serious inconvenience to myself. If your correspondents can throw out any suggestion how to act, I shall feel extremely obliged. Are there no sanitary inspectors?

Ealing. T. P. M.

THE MARBLES OF TUSCANY AND MODENA, AND THOSE OF THE BRITISH ISLES.

A PAPER was read, on 23rd May, at the Society of Arts, by Mr. W. P. Jervis, F.G.S., "On the History, Geological and Geographical Distribution, and Commercial Bearings of the Marbles of Tuscany and Modena, and of the Boracic Acid Lagoons of the Maremme."

The salient points treated of in reference to marble related to a proposition for tramroads connected with the quarries at Carrara, Serravezza, and Massa,—the quarrying by cave workings, instead of allowing the stone to be continually exposed to the atmosphere,—the absurd practice of the late Modenese Government of taxing the marbles,—and the small quantity of marble which we consume in England, where it could be so advantageously employed for domestic architectural purposes, especially for internal decoration.

Besides the geological, topographical, historical, mineralogical, and other varied and interesting information afforded in the paper, it contained statistical and other practical and useful details, some of which we may here quote.

I have been unable (said Mr. Jervis) to find the statistics of the production of the late Duchess of Modena in any publication issued in that state. The *Annuario Economico Statistico dell' Italia*, Torino, 1853, gives little more satisfactory information. It is there stated that the exports of marble from Carrara, from 1837 to 1846, were valued at 370,341*l*. The total produce in 1847, including that for home consumption, was estimated as worth 66,139*l*. At the same period, 2,258 persons were employed directly or indirectly in the marble trade. Through the kindness of Sig. Fabricotti, a gentleman who owns extensive quarries, I am enabled to publish more particulars than have probably been yet set before the English public. That gentleman has made out a table, which, though not official, may be considered as pretty accurate.

The paper gave rise to a practical and interesting discussion, of which we must endeavour to give an abstract.

Mr. John Bell said there could hardly be a more interesting subject for discussion than that of the marbles used in art, amongst which, perhaps, the white marbles would be the most interesting, because the statues of old and of the present day were usually made from them. Marbles were, however, found with great variety of colour, and in that way, no doubt, they would be extremely interesting as regarded their use in the decoration of public buildings, &c., which opened a field that perhaps had not been of late sufficiently worked. He believed it was contemplated that a great deal of the interior decoration of St. Paul's should be executed, if the funds admitted of it, in various-coloured marbles, some of the best specimens of which were now to be seen in the apartments of the surveyor, Mr. Penrose, in the Chapter-house. The observations of Mr. Jervis, with respect to these marbles, were very valuable. There were, however, numerous descriptions of marbles, both from Scotland and Ireland, which were of very beautiful colour, which had been worked for a short time, and then, for some reason, laid aside. There were also some fine white marbles obtained in this country, but whether they were sufficiently white throughout for statuary purposes he did not know. The white marbles of Scotland and Donegal were very beautiful. No description of white marble, however, equalled the Parian, which had been principally found in the island of Paros; but he belived that the whole yield of it had been completely exhausted. A similar description of marble had been found in the neighbouring island of Naxos. The beauty of Parian marble consisted in this—that it had exactly the same amount of transparency that there was in the human flesh, which made it so suitable for statuary. The Carrara marble was of a different character: it was not nearly so beautiful as the Parian for the purposes of sculpture. It was called lunar marble, from its moonlight colour. Mr. Jervis had alluded to the manner in which the blocks of marble were sent rolling down the sides of the hills at Carrara and Serravezza. It was no doubt highly desirable that a better mode of bringing down the marble should be adopted. He believed the blocks were, in the first instance, blasted with gunpowder, which shook the marble very much, and then the rolling down the steep declivities of the mountains tended to increase the "shakes" throughout the block, and deteriorated the quality of the marble for the purposes of art.

Professor Tennant said he had brought with him an old diagram of brecciated marbles, composed of broken fragments, of which chimney-pieces were often made. Another form was that of the conglomerated marbles, which were extensively used some years ago for decorative purposes. Many specimens of them were to be found at Hampton Court, and other of the older palaces in this country. He was sorry Mr. Jervis had not given them a little more information with regard to other materials which were found in the country of which he had principally treated. Amongst other substances might be mentioned alabaster and serpentine. The serpentine was the "green marble" of Italy, and was at the present time used there to an enormous extent. These compact marbles were useful for many purposes, although they were not adapted for external work in this country, owing to the influence of our climate. He would particularly refer those interested in this subject to the house No. 76, Strand, the interior of which was some few years ago fitted up at great expense in various marbles. It was now occupied as a penny newsroom, and it would well repay a visit to inspect the beautiful marbles which were let into the walls, although at the same time they would have presented to them the fact of the perishable nature of those Continental marbles under the influence of the London atmosphere. Professor Tennant proceeded to call attention to a serpentine material, which was to be obtained by thousands of tons in Galway—a fact he believed not generally known. In the model-room of the Society's house there was to be found, in a window-seat, a remarkably fine collection of British marbles. They had been roughly used, but if they were repolished they would form one of the oldest and best collections of British marbles that could be met with. Few countries afforded better specimens of marble than the British Islands. They might be placed as "No. 2" in the series of countries which afforded marbles. In Tuscany, however, these materials might be obtained at comparatively small cost if proper machinery were introduced for the working of the quarries on a large scale.

Mr. Jervis remarked that the marbles of this country generally partook of the character of limestones. All British marbles might be called either marbles or limestones. With regard to the marbles of Italy it was different. All the specimens on the table from Carrara had a more or less crystalline structure, and had lost their original texture. In illustration of this he might state that in the marble districts of England the *detritus* produced by the action of the weather was in the form of a kind of mud. Near Bristol the roads in rainy weather were covered with a close, compact mud, which adhered very tightly to the clothes. On the other hand, in going through Carrara, he had noticed that the *detritus* was of a different character. The crystalline particles were separated from each other by the weather, and the result was calcareous sand, in particles of considerable size.

Mr. C. H. Smith said he would offer a few remarks of a practical nature. Many years ago he read a paper before this society, "On Marbles, and their adaptation to ornamental purposes." At that time he had endeavoured to discover some record amongst ancient authorities which would satisfy him that Carrara marble was to be found amongst some of our antiquities. He had, however, hitherto failed to satisfy himself that there were any antiquities now remaining of Carrara marble. In this country no building of Carrara marble had stood even a couple of centuries. The cornices and capitals of the Pantheon at Rome were of white marble, but he very much doubted whether they were from Carrara, and a great portion of St. Peter's was built of Travertine, which remained very white up to the present day. They knew very well that in this country Carrara marble would not last for any great length of time, and it was scarcely possible to find a specimen 150 years old, unless it had been preserved by repeated painting. The statue of Queen Anne, in St. Paul's Churchyard, had suffered from the weather, and it had been necessary to replace some portions. Since that it had been frequently painted, and might possibly last for many years longer. He admitted, however, that in warmer climates the Carrara marble might be more durable. There was a specimen which was within reach of the inspection of all—the statue of Her Majesty in the Royal Exchange. That was going very fast, and the angular portions might be easily broken off with the thumb and finger. The same might be said of the statue of Charles II., which was placed in a niche in the ambulatory of the same building. Another important material was the dove marble, which contained one or two per cent. of carbonaceous matter. In his opinion this colouring matter diffused through the mass made it more durable. A specimen of that marble was afforded by the tomb erected about thirty years ago by Sir Francis Chantrey to the memory of David Watts, in St. John's-wood burying-ground. That, even, was already in a state of decay. Another specimen of perishing marble was to be found in the Marble Arch, at the end of Oxford-street. With regard to the marble of Porto Venere, mentioned in the paper, it had this disadvantage, that it was apt to split under the action of the hammer. With reference to the sawing of the marble abroad, the material was of that extremely brittle nature that it should be transported in larger blocks to its destination, as, when sawn into slabs, it was extremely liable to split. It could be sawn in this country so cheaply, that it could never in the long run answer the purpose of the merchant to import it already sawn. He had no hesitation in saying that Parian marble was infinitely superior to the Carrara in standing the weather in this country. The only specimens which had been exposed were fragments at the British Museum, which had stood out of doors. Carrara marble became disintegrated all through the mass, but the action of the atmosphere upon Parian marble only decomposed the surface, as was shown by the Elgin marbles. In cases where the object was durability, as in the instance of monuments and tombs in cemeteries, he should prefer many descriptions of stone to marble.

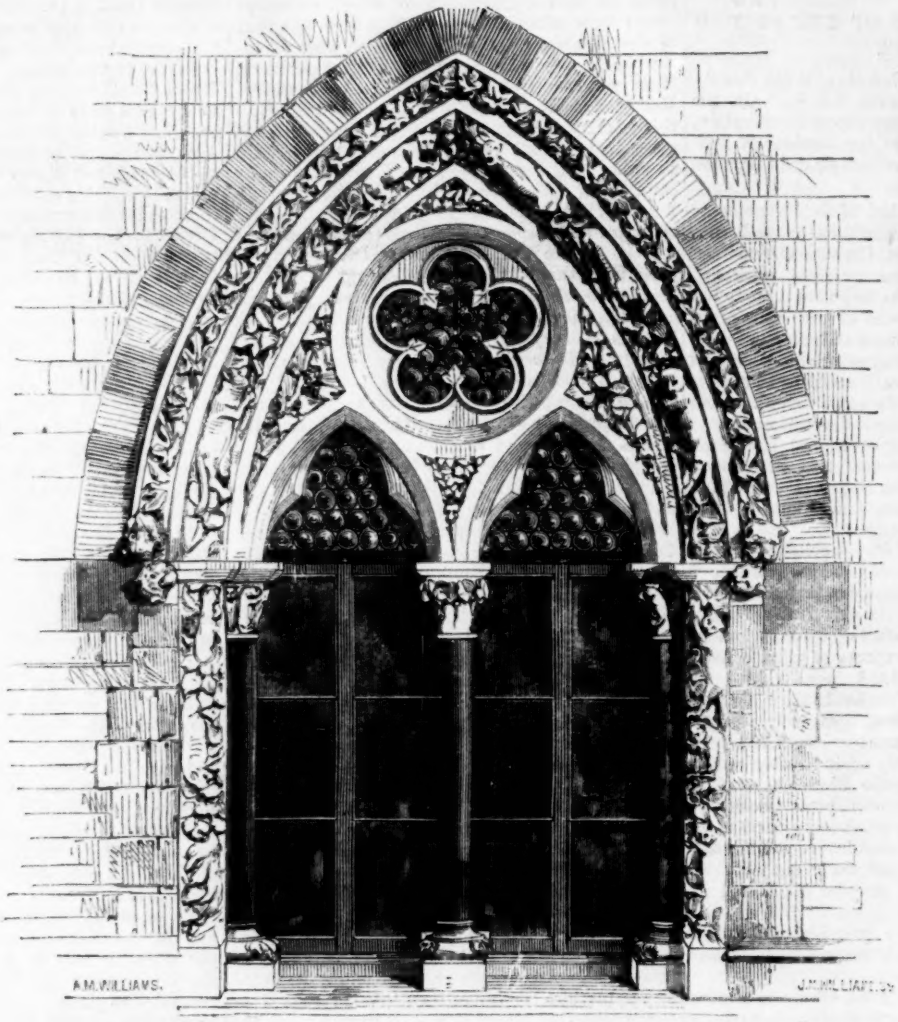
The Chairman congratulated the Society upon the interesting paper which had been presented to them that evening, and also upon the practical character of the discussion which had arisen upon it. He was persuaded, from conversations he had had with Mr. Jervis, that he had not communicated one tenth part of the information he possessed on this subject. He would advert for a moment to the disintegration of the stones alluded to, which was so important in an economic point of view. In connection with all these facts, observations were easily made in the laboratory upon the comparative durability of stones. Those who had burnt various descriptions of limestones knew the different way in which the fire acted upon them. Carrara marble, if heated in a fire, crumbled to pieces; that disintegration took place to which Mr. Smith had alluded. The particles of Carrara marble were held together by so slight a tie that the heat of the fire destroyed their cohesion. In other kinds of marble the cohesive power, about which we knew so little, was infinitely greater. The Chairman concluded by proposing a vote of thanks to Mr. Jervis for his excellent paper. The vote of thanks was then passed.

The *Journal of the Society of Arts*, of the 1st of June, we may here add, contains a supplementary letter answering objections raised by Mr. C. H. Smith, and corroborating Mr. Bell's remark regarding the use of Carrara marble, as proved by the name of the port whence it was shipped, viz. Luna. The letter alluded to also contains the prices of marbles at Serravezza.

THE "BUILDER'S" LAW NOTES.

Alteration of Footway.—There was a footway across a brook, by means of fourteen stepping-stones. The surveyors of the highways of the parish reduced the number of the stepping-stones to eight, increased their height, and placed flagstones on the top of them, forming a kind of bridge for the public convenience, whereby the traffic on the footway was increased to the annoyance of the owner of the adjoining land. He caused the flagstones to be removed, and was convicted before the magistrates on an information by the surveyors under the Highway Act. Having appealed to the Court of Queen's Bench, that court set aside the conviction, on the ground that the surveyor was guilty of a trespass in putting down the flags. It was an unauthorized enlargement of the public right by making the way a species of bridge.—*Sutcliffe* v. *The Surveyors of Sowerby*.

Pawnbrokers.—Loss of Pledge by Neglect.—A pawnbroker placed a gold watch (a pledge) with other valuable property in a strong room which was left at night without any guard. No person slept on the premises. The house was entered at night, the room broken open, and the watch with other property stolen. In an action against the pawnbroker he was adjudged by the magistrate to pay the pawner the full value of the watch, and this decision was confirmed by the Court of Queen's Bench on appeal; it being held that to leave unguarded premises containing so much valuable property was a "neglect" within the meaning of the Pawnbrokers' Act. — *Healing* (*appellant*) v. *Cathrell* (*respondent*).



THE OXFORD UNIVERSITY MUSEUM: WINDOW.

THE OXFORD UNIVERSITY MUSEUM.

OXFORD is celebrating its great Commemoration Festival, and is running over with life. There have been concerts, and speeches, and exercises: all the buildings have been examined, and the adjoining localities visited. That we may be *apropos*, we give some additional illustrations of the University Museum, namely, a view in the court, showing chiefly the ironwork of the roof and its supports, and one of the windows. In previous volumes will be found a plan of the whole, external views, and examples of the carved capitals and corbels, together with descriptive particulars.* The museum was built, as our readers know, under the superintendence of Messrs. Deane & Woodward.

The ornamental portion of the roof is of wrought-iron, and was executed by Mr. Skidmore. In the spandrils it takes the shape of interwoven branches, with leaf and flower, of chesnut, sycamore, palm, oak, and other trees, while in the capitals of the columns and elsewhere are seen the passion-flower, water-lily, ivy, holly, and other plants, effectively wrought. The amount of the contract for the ironwork of the roof, including the cast-iron pillars, was 5,000*l.*

Mr. Munro has completed six of the statues, to be placed on corbels against the piers of the cloister around the court, namely Galileo, Leibnitz, and Newton, commissioned for presentation by her Majesty the Queen; Sir Humphrey Davy, by the Marquis of Lothian; James Watt, by Mr. Boulton; and Hippocrates, by Mr. Ruskin.

LORD BACON RIGHTED.—We are glad to hear that Mr. Murray will shortly publish "Francis Bacon, Lord Chancellor of England," by Mr. Hepworth Dixon, being an inquiry into his life and character based on letters and documents hitherto unpublished. This work, though new in form and in material, will contain the substance of the very remarkable and interesting articles on the subject which appeared in the *Athenæum* in January last.

* See Vol. XIII. pp. 291, 318, 319. Vol. XVII. pp. 252, 253, 491, 498.

THE VOICE OF A TOWN.

WE once spoke of the voices of old buildings. The thoughtful wayfarer in this great city cannot fail to be impressed with the varied and peculiar sounds which form one of the peculiarities of this teeming city, and which mingle together and produce a voice singularly impressive. It may be heard with solemn effect sounding in the dome of St. Paul's, and less loudly, though distinct, in still weather, in quiet nooks in the suburbs. When the varied materials which compose this mighty voice are considered, the mind becomes bewildered in the contemplation of what for more than 2,000 years has been constantly increasing, and now includes the mingled tones of nearly 3,000,000 of people. What rolling of carriages, what clattering of heavily-harnessed horses, aid in the hubbub! The measured tread of a detachment of police, the marching and countermarching of soldiers, the footsteps of thousands, the hum of schools, the unceasing rattle of steam-engines, and the roar of furnaces, are amongst the details! Many evil voices are raised, but there is also a corrective agency at work, for preachers in churches and chapels, professors, and lecturers, are busy; and missionaries, who in certain districts are as greatly needed as they are in the Sandwich Islands, zealously labour; while lawgivers, judges, and magistrates, who dispense laws, and the crowd of council exercise their important functions.

The mallet of the sculptor: the more homely but useful working of the stonemason; the hammering of the carpenter, and the chipping of the bricklayer; even the quick tapping of the coffin-maker, all play their part in the city voice. Music and minstrelsy; the hoarse voice of street traders are there; in banks and counting-houses the chinking of gold adds a low but important sound. Go where you may, additions are made to the voice. Ten or twelve thousand machines of the half-starved Spitalfields silk weavers give a peculiar note. Bells toll, others ring joyful peals, and some send forth old-fashioned tunes; so great, however, is the roar of the city, that these cannot be heard when more than a few yards distant.

Memory goes back to many city sounds which contribute towards the general whole: the peculiar and rambling voice of madness; the compressed moan of suffering in hospitals; the lamentations for those who every hour die in this vast hive. There are, however, more pleasant suggestions in it. The language of most civilized nations and the music of sunny lands may be detected. In a street in Bloomsbury, a few hours ago, we heard the peculiar note of the Italian bag-pipe. Soon a group of shepherds of the Abruzzi came in sight, performing the dance of their native district. Singular was the contrast with all around: dusky black hats, trimmed with scarlet ribbons, glittering silver crosses and other ornaments; closely-fitting coats of sheepskin, with the hair turned outwards; knee breeches of bright glossy green, like the breast of the peacock; goatskin wallets and water-bottles; the legs covered with leathern sandals; the primitive bag-pipe, formed of goatskin, together with swarthy countenances and coal-black hair, presented a curious picture, the more remarkable from the circumstance that the costume has remained unchanged for more than a thousand years. The old Romans, whose effigies are in the Museum hard by, have listened to the same piping; and so the past is wedded to the present: and a note of sound, one component of the mighty voice of London, suggests a long train of thought, and makes the world populous with the dead.

THE PUBLIC PARKS, NEW YORK, U. S.

MR. CALVERT VAUX, formerly of London, now architect to the public parks at New York, in a private letter says that "the park is quite a popular affair already, 40,000 or 50,000 people visiting it every fine Sunday, even in cool weather. We have fortunately secured another half-million pounds for it this last winter. It has already cost one half million; but this has resulted to a considerable extent from the streets all round being at inconvenient levels, and from the great quantity of rock everywhere. The park is 2½ miles long, and half a mile wide."

THE OXFORD UNIVERSITY MUSEUM: VIEW IN THE COURT.

CHURCH-BUILDING NEWS.

Ipswich.—The foundation-stone of Burlington Chapel has just been laid. The new chapel, according to our authority, the *Suffolk Chronicle*, will be identified with no particular sect. It is to be called Burlington Chapel, simply because it will stand in Burlington-road. A few years ago, this part of the town was the domain of market-gardeners. Now it is studded with houses and villas, and the builder is still superseding the gardener. The new edifice will be Italian in character, and built with red brick, with stone and white brick dressings. The external dimensions are 76 feet by 45 feet, and it is estimated to seat 360 persons, exclusive of galleries, which will not be erected at present. The plans also include school-rooms and vestries. The architect is Mr. Ribbans; the builder, Mr. Hunt, of Freston, whose tender was 1,059*l*., and who has engaged to complete his contract by October next.

Wivenhoe (*Colchester*).—The wood-carving of the restored church, described on 16th June, was executed by Mr. Polley, of Wivenhoe, and Mr. Radburn, of William-street, Regent's-park.

Loughton (*Essex*).—The first stone of the new Baptist chapel was laid on Thursday, 7th instant, by Sir S. M. Peto, Bart., M.P. It is intended to accommodate about 350 persons. There are no galleries at present, but provision is made for them, should the increasing population require their introduction. The plan is a parallelogram, with curved approaches by twenty-one steps at the sides, which take you to the floor of the chapel, beneath which are school-rooms. The style is Roman Doric, on a rusticated base. The total cost of erection is to be 1,950*l*. The architect is Mr. William D'Oyley; the builder, Mr. Martin Page.

Wallingford (*Berks*).—The foundation stones of the Episcopal and Nonconformist chapels, in connection with the new cemetery, at Wallingford, have been laid by the mayor. The plans and designs, selected by the Board in competition, were prepared by Messrs. Woodman & Poulton, architects, Reading. The style adopted by them is the Early Decorated Gothic. Messrs. Orton & Child, of Reading, are the builders, and the estimated cost of the works, which they have undertaken to complete in six months, is a little under 2,000*l*.

Bristol.—The foundation stone of a new Congregational church has been laid at Redland-park. The edifice will be erected on the north side of the nursery-ground which lies to the right of White Ladies'-road. The architecture will be in the Early English style, and will be simple in design. The material used is to be blue lias, with freestone dressings; and, by way of variety, a deep red sandstone will be introduced. The church will consist of a nave, and north and south aisles, with a transeptal recess in the north aisle, in which will be placed a Scudamore organ. The length of the nave will be 73 feet, and the width, with the aisles, 48 feet, besides small transeptal projections to the aisle. The nave is to be 26 feet 8 inches wide, and 50 feet in height. The edifice will be lighted by a clerestory round the aisles. Sitting accommodation will be provided for 520, and it is intended at some future time to add an end gallery. The pillars in the nave will be octagonal in form, and of blue Pennant stone, with carved freestone capitals. The tower, which will be 16 feet square, and which, with the spire (of slate), is to be 141 feet in height, is intended to be placed at the west end of the south aisle. The estimated cost of the whole, including the purchase of ground and all extras, is 4,200*l*. The architects are Messrs. Fripp & Ponton, of Bristol; mason, R. Wilkens; carpenter, D. Jones; plasterer, C. Hill; plumber, H. B. Osborne.

Barbourne (*Worcester*).—A new church is to be erected at Barbourne, near the Crown Inn, on the Droitwich road. The edifice is to be in the Early English style, and will accommodate about 500 persons. It will have a chancel, nave, aisles, vestry, entrance-porch, and tower. The entire length is 125 feet; and from the ground to the top of the pinnacle on tower, 120 feet. The east and west windows will be of three and four-light trifoliated lancets, with quatrefoils and tracery, the masonry of grey Alveley stone, and the windows in the side walls will be coupled lancets: there is to be also a range of clerestory lights, deeply recessed. Four pointed arches divide the aisles from the nave. The porch is on the southern side, opening into the aisle. Minton's tiles will be used in the chancel. The walls are to be constructed of Hadley stone, presented, according to the *Worcester Herald*, by Mr. T. G. Curtler. The church is to be covered in by the 1st of next May, and the whole work completed by the 1st of August, 1861.

Holmer (*Hereford*).—The ancient church of Holmer, one mile and a half north of the city of Hereford, on the Leominster road, has been restored. The work of restoration has been executed from the designs and under the superintendence of Mr. J. H. Evins, of Hereford, architect. The chancel not being under the control of the parish, that part has not been touched. The expense of the improvements has been almost wholly met by voluntary contributions. The school cost 480*l*., of which 208*l*. was a grant; and the cost of the restoration of the church is about 330*l*., of which only 50*l*. has been supplied by a church-rate. Exclusive of the chancel, accommodation has been thus provided for 228 persons in the nave, and 50 in the gallery; total, 278. The woodwork has been executed by Mr. Mason; the stonework by Messrs. David & Philip Pritchard; the stone carving by Mr. P. Pritchard; and the colouring by Messrs. Savory & Son.

STAINED GLASS.

Chester.—A stained-glass window has been lately fixed in St. Peter's Church, Chester. It is the gift of the Rev. John Watson, the rector. The window is divided into four compartments, each containing a group illustrating the following subjects:—The Miracle of our Saviour at the Marriage Feast; Feeding the Multitude; the Woman taken in Adultery; Martha and Mary. They are fixed in a geometric form, surrounded with ornamental scroll work, of the Early English period. The rector, according to the *Chester Chronicle*, has fixed upon subjects for the same side of the church, illustrating the entire life of our Saviour. The window just fixed has been executed by Messrs. J. A. Forrest & Co., of Liverpool, the same firm who executed the window in the church at Chester Castle.

Ripon.—There has been inserted in the third large Perpendicular window, on the south aisle of the nave of Ripon Cathedral, a window of stained glass, "to the memory of the Hon. Caroline, wife of Charles Thomas Longley, successively Bishop of Ripon and Durham, who died in 1858." The window was purchased by subscription. There are three large figures, representing Faith, Hope, and Charity—the last of which occupies the centre light. Messrs. Hardman, of Birmingham, were the artists.

CURIOSITIES OF LEARNED SOCIETIES.

IN the rooms of the different societies in the metropolis there are matters of curious interest, which, although well known to members and their friends, are not visible to the masses of the community. For instance, in the apartments of the Royal Academy, there are the diploma pictures of the Academicians since the foundation of that institution. Some of these are certainly not worthy of the masters, but, taking them as a whole, they present many characteristics which repay study. In the rooms of the Society of Antiquaries there are many rare objects, which are seen but by few.

At the Royal Society, in Burlington House, there are some choice matters, which have a world-wide interest. There are, for instance, the sun-dial cut in stone by Sir Isaac Newton's own hands, and the first reflecting telescope, which was also fashioned by the skilful hands of the great philosopher. The electrical machine of Dr. Priestley, of Birmingham, has been recently added. The mace presented to the Society by King Charles I. was long supposed to be the mace of the House of Commons ("the bauble"), which Oliver Cromwell ordered to be taken away. There is a fine collection of portraits.

THE PRESENT HIGH PRICE OF PROVISIONS.

THE present prices press very heavily on the workman. Great meetings on the subject have been held at Bristol and elsewhere. Many have blamed the dealers, both wholesale and retail, for causing the present extraordinary increase in the price of butcher's meat, and recommend that we should go back to plans which were once resorted to for the purpose of preventing "forestalling" or the trimming of the markets. It is clear, however, that in these days of competition, provisions will find their true market value, and that such proceedings would be of no avail. The lambs have perished this season in consequence of the inclemency of the weather, and cattle have died in vast numbers for want of fodder and from disease caused by the flooding of the land. In short, the demand for butcher's meat is greater than the supply. For some time past, even in good seasons, this evil has been apparently on the increase. The subject, therefore, requires careful consideration how to obtain increased supplies from abroad, and also how best to increase and economize the quantity produced at home. The population is constantly increasing, and in times of prosperity great quantities of animal food are consumed. It is reported, too, that from one cause and another the English stock is falling short. Amongst the reasons given for this is the practice of killing animals at an early age for the market, and so preventing the proper extent of breeding. This is worthy of thought. An endeavour should be made to save as much as possible. At present, one-third of the nutritious portions of animal food used by the families of the working classes is wasted; while, in the kitchens of the rich, a great saving might be made, which would be of the greatest advantage to the poor, if rightly applied.

TO ASCERTAIN WEIGHT OF LEAD, &c.

"ONE of the Profession" asks (p. 355) for a means of ascertaining the weight of lead, glass, &c., without weighing them in scales. The following tables will assist him in doing so, the only instrument required being a pair of calipers.

As the same method can be applied to materials of all kinds, I will give the formula for logarithm calculation.

Taking the specific gravity of lead = 11·35,
Weight of cubic foot of water = 62·5 lbs.,
Weight of cubic foot of lead = 709·4 lbs. = w,
t = thickness of lead in parts of an inch,
n = number of lbs. in a square foot of lead of thickness t.

Then, $w : n = 12 : t$;

or, $t = \frac{12 \times n}{w}$, taking the logarithm of both sides,

we have $\log. t = \log. 12 - \log. w + \log. n$, which gives the value of t for every value of n.

No. of lbs. in square foot of lead.	Thickness of lead, in parts of 1 in.
4 lbs.	·068, rather more than $\frac{1}{15}$ in.
5 lbs.	·085, " " $\frac{1}{12}$ in.
6 lbs.	·10, " " $\frac{1}{10}$ in.
7 lbs.	·12, nearly $\frac{1}{8}$ in.
8 lbs.	·14, " $\frac{1}{7}$ in.
9 lbs.	·15, between $\frac{1}{7}$ in. and $\frac{1}{6}$ in.

The thickness of glass can be calculated in the same way. Taking the specific gravity of crown glass at 2·52 (plate and other glasses have a higher specific gravity)—

No. of oz. in square foot of glass.	Thickness of glass, in parts of 1 in.
13 oz.	·062, or $\frac{1}{16}$ in.
16 oz.	·076, nearly $\frac{1}{13}$ in.
21 oz.	·1, or $\frac{1}{10}$ in.
26 oz.	·124, or $\frac{1}{8}$ in.
32 oz.	·15, rather more than $\frac{1}{7}$ in.

E. WYNDHAM TARN.

M. T. Gerard, of Paris, has sent us a sketch of a small instrument in use there, to ascertain the weight of lead, which indicates the half-tenth of a millimètre.

THE LABOUR MARKET IN THE PROVINCES.

MATTERS still continue in a very unsettled state.

The *Chester* joiners have struck for an advance of 2s. a week, except those of late receiving 1*l*. 5s., who demand 1s. advance.

The *Gloucester* horse-nail makers are on strike for an advance of 3d. per 1,000. An advance had been already made a few months since. The wages of good and steady workmen, it appears, were 25s. throughout the year.

At *Hereford* there is a partial strike amongst the masons and bricklayers, for a reduction of hours from 10½ to 10, and from five o'clock to four on Saturdays.

At *Leeds*, a strike of joiners for an advance of 2s. a week has just terminated, by the masters agreeing to the demand. The stonemasons, however, have given notice that they will strike work on 2nd July, unless certain concessions are made to them. They want the hour for commencing work on Monday mornings to be altered from six o'clock to seven. They also object to sub-contracts, and make certain propositions in reference to the erection of sheds and piece-work.

The *Bradford* dispute remains somewhat in the same position as when last alluded to. The largest employers are without workmen, 350 masons having now left their employ. The operative masons' committee allege that nearly all the men who turned out have got work either in town or elsewhere; but the local *Observer* states that the largest and most important works there are still deserted. The associated employers have resolved to offer the men an advance of 1s. per week on the present wages of 25s. and 26s. per week, and a reduction of two hours' labour on Saturday, in place of the terms sought, viz., a reduction in the time from 57½ hours to 51½ hours per week. The operatives' committee, however, reply that they will be content with nothing less than a reduction of one hour per day and the same wages. At the

works at the Midland Station, there is nearly the full complement of men engaged. They are receiving an advance on their wages of 2s. per week, the hours remaining unchanged.

The *Halifax* masons are at work, after a strike, with the promise of better wages, where demanded, to the best workmen.

At *Rochdale*, the painters have been on strike, but a large number have left the town, as the masters refuse to give them 10 hours' wages for 9 hours' work.

In the *South Yorkshire* coal mining district, a serious suspension of work is threatening. The miners demand an increase of wages, and in some cases they have already struck, while the masters have combined to resist the demands of the men, who are supported by the Miners' Association, and a general turn-out is dreaded.

CLUBS FOR THE MIDDLE AND WORKING CLASSES.

ALLOW me to confirm the views of your correspondent of last week, "A City Clerk." We have in Worcester a similar club—for the use, however, of working men—to that he desires for his own class. Our lodgers are a most useful feature, and they, and our quarterly and other members, can obtain refreshments at moderate cost, have the use of fires and reading-room all day long, and, what many of them consider of perhaps more consequence, can, after a hard day's work, smoke their pipe and converse with their friends without being forced for such purpose to the tavern. It pays, and from my daily inspection is I believe of immense benefit to many of the operative classes, a committee of whom have it under their sole control. Our playgrounds are extensively used by old and young, and many who would never venture inside the ordinary Mechanics' Institute come to us for the superior recreation we give them without expense; and, when with us, readily conform to our few rules, and also take advantage of the means of mental improvement placed within their reach. Sir E. H. Lechmere, Bart., who has taken much interest in its success, has converted a roadside public-house on his estate into a similar undertaking, and, though yet unfinished, and in a thinly-populated village, has, in its new dormitories, built by him at great expense for such purpose, as many labourers as nearly to fill them; indeed, more apply than can at present be accommodated. Both these institutions are carried out on a principle without which they will never permanently thrive, namely, the exclusion of beer, wine, and spirits. Lodgers of course can obtain in their own rooms anything they require, but it must not be sold on the premises,—at least in those established for the use of working men. Were such clubs to be formed throughout the country we should, I think, soon hear less of poverty and crime, while strikes and intimidation would die out with the improved habits of the operative classes.*

A LAY CLERK, Worcester.

LIVERPOOL BOROUGH CEMETERY.

SIR,—With reference to a paragraph in your last under the above heading, allow me to say the extent of the cemetery site is eighty-six acres, or nearly, and the proposed cost, including the chapels, not 100,000*l.*, but somewhat under one-third of that amount. Being the successful competitor for the work, I fully expected that the Burial Board would have appointed me to carry out my design in the usual manner; but through one member of the Board, the appointment of last Monday was made, on conditions to which *no professional man could accede*, namely, a small salary and a most unexampled sacrifice of time. I trust that this may be the *last* instance, as it is the *first*, of appointing an unsuccessful competitor to carry out the ideas of those who have earned the right of superintending their designs to completion.

THOMAS D. BARRY.

LEICESTER SQUARE AND COVENT GARDEN.

THE ground has been cleared for the formation of the intended new thoroughfare to Covent Garden commencing at the western end of Long Acre,—an improvement which has long been needed. At the King-street end a building with a considerable frontage, 117 feet, has been erected for Messrs. Debenham, Storr, & Sons, the auctioneers, from the designs of Mr. Arthur Allom. The site, an irregular triangle, presented some difficulties.

The principal entrance on the ground-floor is made the centre of the building, and leads to a hexagonal hall laid with Maw & Co.'s encaustic tiles. On each side are polished oak folding-doors; those on the right communicating with the public offices, and those on the left with the principal auction-room. This room occupies 1,160 superficial feet, is 24 feet in height under the lanterns, and is ventilated by means of perforated ornamental ironwork in the ceiling, as well as by the front windows and the swinging sashes in the lantern. The rostrum stands in the north corner. A spiral iron staircase leads to the first floor. The goods delivery room adjoins the offices, and communicates by a staircase with the warerooms below. The private entrance is on the east side of the building, adjoining the Westminster Fire Office, and has a staircase to each floor. The public staircase, of Portland stone, has a dado of ornamental tiles. It leads to a room about 50 feet by 30 feet, set apart for the view and sale of bijouterie, silver plate, paintings, and works of art. The rostrum, of mahogany, forms an important feature.

Externally, cement and Ransome's artificial stone are used. The style must be called Italian. It is a good bold front: the blocking course of the frontispiece has an incised ornament, and the heads on the key-stones on the ground floor are very well modelled. Messrs. Mansfield & Son were the builders.

OMNIBUS VENTILATION.

THERE are plying daily in London some 7,000 of these locomotive habitations, which, carrying on an average 100 fares each, would chamber 70,000 persons in close contact. The approach of warm weather, and the comfortless state of the great majority of the 'buses, render it a matter of moment to those who are forced to avail themselves of threepenny or fourpenny fares to the City to appeal to proprietors of these vehicles for some little attention to one or two points, which, if regarded, would add to the comfort of all travellers from the suburbs to the Bank, and which, if properly attended to, must increase their own profits, by making the accommodation more complete.

Sir, I have no carriage of my own, and am obliged to travel daily to and fro the City in the long ranges. Three out of four of the omnibuses are too small for twelve insiders, more particularly if a fat gentleman or lady get wedged in on the same side, when there is but one vacant place, and that is at the far end from the door! Well, you have to spread your arms to catch the roof ridge, for there is no guide-strap to hold by! At length you are seated, twelve in a space 9 feet by 4 feet 6 inches, and 5 feet high: the air is suffocating; an endeavour is made to open the ventilator, or what is so called, but it won't move. "Conductor," some one cries, "open a window." Well, it won't open; or the party sitting next to it very properly refuses to incur the hazard of a crick in the neck. Venti'ators! did I say? Why, sir, they are certainly made of wire gauze, but so fine that they absolutely exclude air, and might serve as protectors to a miner's Davy lamp.

Now what I want to teach omnibus owners is, that a ventilator, to serve the purpose, ought to have perforations large enough to pass a small pea; and that even these, but particularly that at the driver's end of the 'bus, should be made *to open in hot weather*.* As at present constructed, they are all either immovable, or when opened (if on pivots), they will most obstinately close in again through the oscillation of the vehicle! The grievance of dirty and battered, and ill-ventilated omnibuses, is becoming daily worse. Pray, sir, do remonstrate on the part of compressed and stived up wayfarers, who have no alternative but submission to grievances such as daily afflict

PEREGRINE TRAVELLER.

WEST WINDOW, GLASGOW CATHEDRAL.

A SPECIAL meeting of the Glasgow Architectural Society has been held to hear a report from a committee as to the stained glass recently put up in the great west window of the cathedral. In the report the committee said:—

"Some considered that the beauties of the window more than counterbalanced its defects, while others held opinions quite the reverse. On the whole, however, your committee agree in speaking with much approval of the four pictorial panels which constitute the chief feature of the window. These panels or pictures represent, first, 'Moses giving the Law;' second, 'Priests crossing the Jordan with the Ark;' third, 'Dedication of the Temple;' and, fourth, 'Jews in Bondage at Babylon.' The figure-drawing in these pictures, as well as the grouping and colouring, are unquestionably an embodiment of a high class of art. Indeed, so far as the art-conception of these pictures is concerned, and even in some respects the execution, your committee could see little or no ground for fault-finding. And it is while cheerfully making this acknowledgment that we must express our surprise that the head and hands which produced the panels—if it were the same head and hands—should have been satisfied with work so inferior for the other portions of the window. If the design of the window and its general filling up had been at all equal in conception or execution to the panels themselves, this section of our report, embracing, as it does, the purely artistic question, would have contained little else than commendation. Instead of this being the case, however, the design and filling up are not only inferior to the panels, but oppose them in harmony and conception—suggesting, indeed, the idea, that after the panels were finished, some mere workman had been entrusted to design and complete the rest."

On the question of the suitability of the glass to the cathedral itself, in character, colour, and design, the report said,—

"While your committee, as explained, had diversity of views as to the mere artistic merits of the window, they were unanimous, with one exception, on the fact that, be these merits what they may, the glass, as it stands, is neither in character, colour, nor design suitable for the cathedral of Glasgow."

An amendment rejecting the report was moved, but the report was ultimately carried by seven to three.

THE WESTMINSTER PALACE CLOCK.

IT appears, from a reply recently given by Mr. Cowper, that there have been 20,300*l.* spent on this work, and that an additional sum of 1,750*l.* is in course of being expended: 22,050*l.*, even if that will finish it, will therefore have been expended for this clock; and then it seems by no means certain that the matter will be complete. It is, however, promised, that any fresh requirement on this account shall be brought before the consideration of Parliament. In the midst of laughter Mr. Cowper stated that the present stoppage was caused by the necessity of cleansing, for, owing to the works for illuminating the clock at night, a good deal of dust had got into it. A delay had also been caused by the fracture of one of the hands, "and much difference of opinion had arisen as to the best means of repairing that defect."

In the conflict of opinion the Astronomer Royal had to be called in, and under that gentleman's superintendence the alteration of the striking of the clock will take place.

The expenditure upon this work is enormous, and without consideration of the future cost of cleansing and necessary repairs, the interest at 5 per cent. on the present outlay would amount to upwards of 1,100*l.* per annum. This, irrespective of maintenance and of attendance, is no matter for mirth, but would less require notice were it not a type of the mode in which public money is expended.

HARBOURS OF REFUGE AND THE HOUSE OF COMMONS.

ON Tuesday evening last, Mr. Lindsay moved, "That it is the duty of Her Majesty's Government to adopt, at the earliest possible period, the necessary measures to carry into effect the recommendations of the commissioners appointed in 1858 to inquire into the formation of harbours of refuge on the coasts of Great Britain and Ireland." He called the attention of the House to the vast extent of our inward and outward trade, to the loss of life and the amount of property (not less than 1,500,000*l.*) annually sacrificed on our coast, and to the entire absence of harbours in some parts of it to which vessels could run for shelter in stress of weather. What was wanted, was not such harbours as Dover or Alderney: the country would not get value for its money, he said, in the works going on at these places. As one of the commissioners, he expounded their views as to the nature of the harbours required, and their localities, embodied in the recommendations contained in their report. All he desired was to induce the Government at the earliest possible period to commence this national and necessary undertaking; to make preparations forthwith, and next year begin works that would mitigate the heavy losses of life and property.

The motion was seconded by Mr. Farrer, and, after a debate, was carried by 145 to 128.

BRIDGE COMPETITION IN NEW ZEALAND.

THE Waimakariri, one of the principal rivers in the Canterbury Province of New Zealand, requiring a bridge for the increasing traffic between Kaiapoi and Christchurch, a sum of 6,000*l.* was voted for it by the Provincial Council, and designs were prepared by Mr. Dobson, the provincial engineer. It was thought desirable, however, to invite designs from the neighbouring provinces, and a competition was advertised, premiums, 50*l.* and 25*l.*, the advertisement stating that the engineer's design would also be submitted to Colonel Mould, R.E., for his report, though not admitted to the competition for the premiums. Twelve designs were sent in, and Colonel Mould adjudged the first premium to Mr. H. Whitcombe, of Christchurch, but recommended Mr. Dobson's design for adoption. No second premium was awarded, eleven of the twelve competitors not having complied with the conditions of the competition. Colonel Mould, however, suggested that the provincial authorities might find it useful to secure the design of Mr. H. Handyside for other occasions, by paying him the second premium. The report, which is got up in a way it might be advantageous to take example by in the mother country, states that the competition restricted the cost to 12,000*l.*, not 6,000*l.*, and that probably the engineer's design may cost more than the 6,000*l.* voted by the Provincial Council. We observe, by the way, from a New Zealand paper, that the competition designs were exhibited, and that the provincial engineer delivered a lecture on the occasion, in which he treated scientifically of the geology and physical characteristics of the district, changes of the bed of the river, &c.

SIR J. SOANE'S MUSEUM. — The newspapers mention that this museum was visited by 2,097 persons in 1859. It is open for three days a week in April, May, and June, and once a week in the two months before and two months after that period. "The rules require a previous application for admission, but the regulation is not strictly observed."

* Two or three architects have addressed us, saying they have given consideration to plans of buildings for such a purpose. As to that point, however, there could be no difficulty.—ED.

* It is questionable whether the freshest of air can be had after it passes over the steaming horses, not to speak of the clothes of driver and passengers outside. Besides, these end ventilators often stupidly bring the heads of passengers within the draught-current, being too broad.

Books Received.

Things not generally Known familiarly Explained: Curiosities of Science. Second Series. A Book for Old and Young. By JOHN TIMBS, F.S.A. London: Kent & Co. Paternoster-row. 1860.

THIS is certainly one of the most curious and interesting of all the many curious and interesting books of that great book-producer, Mr. Timbs. Moreover, there is less of mere extract, and more of judicious and skilful compilation in it than in some of those which have preceded it from the same indefatigable source. We shall avail ourselves of its curiosities (chiefly chemical) on this occasion to an extent rather unusual with us in dealing with mere curiosities in our crowded and professional pages; but the interest of such a subject as the curiosities of science will, we hope, excuse us with those of our readers who grudge the space thus filched from subjects more immediately practical or professional.

Floating bricks must have been a curiosity of science not by any means out of our way.

"Bricks which float [illegible] water are mentioned by Posidonius, Strabo, and [illegible]vius Pollio, as having been made of an aluminous earth found in Spain, for building, on account of their lightness. Pliny also mentions a pumice-like earth possessing these properties. In 1791, Giovanni Fabroni formed floating bricks from a silicious earth, found at Santafiore, in Tuscany: they were also such bad conductors of heat that they might be held by one end in the hand while the other end was red hot; and similar bricks have been made from the silicious earth dug on the borders of the Spree, at Berlin; whereas floating bricks were hitherto thought to be 'wonders of the ancients.'"

Malleable glass is another curiosity of science quite in our way; although, doubtless, the glaziers would demur to its introduction into practical existence and utility, at least for window-panes:—

"Malleable glass was made in old Rome; and in the reign of Tiberius a Roman artist had, according to Pliny, his house demolished,—according to other writers he was beheaded,—for making glass malleable. The idea of discovering the secret was only ranked second to that of the philosopher's stone among alchemists; but in 1845, there is stated to have been discovered at St. Etienne, in France, the means of rendering glass as malleable when cold as when first drawn from the pot. The substance, silicon, is combined with various other substances, and can be obtained opaque or transparent as crystal: it is described as very ductile and malleable, neither air nor acids acting on it."

Mr. Timbs should have mentioned here, while speaking of the alchemists, that the agent wherewith they professed to transmute metals into silver was the very same substance wherewith they professed to transmute glass into malleable glass. It would have also been worth while to say, for behoof of those who do not know the fact, and as another curiosity of science, that silicon, wherewith the modern malleable glass is alleged to be made, constitutes the very basis and essential element of all ordinary glass itself, only stripped of its oxydous or vitrifying nature. It is very much to be doubted, however, whether malleable glass has as yet been made in recent times,—if indeed it was ever made at all.

While on this subject, and especially considering the connection of the alchemists with malleable glass,—the formation of which involves the very principle of transmutation, although glass is known to be compound, while metals are as yet by chemists treated as (though not believed to be) elementary,—we may here remark that one of the most curious and interesting portions of Mr. Timbs's new book is that which treats of alchemy, with which (historically speaking) he displays no inconsiderable acquaintance. He also quotes Faraday, Liebig, Draper, and other modern chemists, in favour of the principle of transmutation, and would have materially enhanced this curiosity of science, had he also quoted Davy on the subject. There is one little inconsistency, however, which we cannot help here drawing his attention to. On page 8 he says,—"Yet, although the existence of The Stone was regarded for centuries as an established truth, no one possessed it; each adept only maintaining that it was in the possession of another." This, we are quite aware, is the usual hackneyed modern *opinion* on this curious subject, like that other totally mistaken idea as to the much misrepresented alchemists, that they were all visionaries *in search of* a transmuting agent, whereas, unless they were the most unaccountable and extraordinary liars in existence, many of them—indeed, all of them entitled to be called alchemists—already possessed it. However that may be,—that each adept did *not* merely maintain that it was in possession of another, as Mr. Timbs remarks, he himself affords more than sufficient evidence within the next few pages. Thus, on page 10, we are told that Pope John XXII. "professed and described the art of transmuting metals, and boasted that he had made two hundred ingots of gold, each weighing a hundred pounds;" and on page 11 we are informed that Sir George Ripley "pretended to have discovered the secret." The question here, of course, is not whether these and other alchemists alluded to really *did* transmute the metals,—a question we do not mean to take the trouble to enter into,—it is merely a question of whether alchemists really never *alleged* that they themselves had transmuted metals. It is curious, in the midst of all the historical knowledge on this subject displayed in the volume before us, that the evidence of Helvetius in favour of transmutation—evidence which those inclined to disbelieve in its possibility rightly regard as the toughest of all to tear up—does not appear to have come under the author's notice. Moreover, Helvetius was also one of those who expressly declared that he had himself transmuted metal into gold. But enough of this very equivocal and (at least at present) by no means practical subject.

There is another stock curiosity of modern science, however, having reference to the old chemists, and to very erroneous modern ideas as to their ignorance, which our eye has just caught sight of in the vicinity of Mr. Timbs's alchemical region, and to which it may be worth while for a moment to advert.

On the subject of "The Great Discoveries of [modern] Chemistry," it is stated, on the authority of Dr. Neil, that—

"A century ago no person on earth knew that there existed in nature the substance which, since Dr. Priestley's discovery of it in 1774, has been named oxygen."

Now, before showing the error of this, we would wish to make one or two preliminary remarks. The substance which has been named oxygen is that appreciable, and even weighable, though invisible agent which, for example, combines with metals in the fire, and reduces them to oxides, calces, or glasses. It is, by the way too, another and cognate error, in modern scientific conceit, that "a century ago" no one knew that the calces of metals were anything but the elementary and indecomposible bases of metallic substances themselves. All old chemists, it is alleged, supposed the metals to be composed elementarily of such calces, and of another substance which gave them metallic lustre, and which the fire only drove off in calcining the metal.

How nicely, then, does the following little quotation, which we take from Van Helmont's work "Concerning the Macrocosme, or Great World," dispose of both of these vain-boasting and most erroneous "curiosities" of modern science:—

"When we turn 100lbs. of lead into minium, or red lead, we find that the said 100lbs. are augmented 10lbs., viz. when the calx of lead is ground to powder, and afterwards exposed to a small fire, the lead borrows part of its weight from the fire in which it was calcined, and part from the water in which it was ground; and each of these two severally, and both of them jointly, do help to turn the easie melting lead to glass; because THE FIRE *is naturally and easily reduced to a body in lead*, by which means *it also turns all other things into glass*. But, when the lead is exposed to a greater heat in a strong fire, it is forced to leave its vitrifying part behind, viz. the forementioned 10lbs., which *from the fire and water were superadded to it*, and, consequently, turns to a metal as it was before."—*P.* 108 *of English translation, of* 1684, *from the High Dutch, by "A Hollander."*

The ignorance of our forefathers constitutes a stereotyped and very generally credited curiosity of science in our own conceited and fast generation; but there are still more recondite curiosities of science, as we thus see, into which a little deeper investigation and insight into its actual truths, ancient and modern, could speedily initiate us, would we only take the trouble.

We had marked for extract or comment various other of the many interesting and suggestive *bonbons* presented to us by Mr. Timbs in the present curious little volume; but our space is exhausted, and all we can further do is strongly to recommend the work itself to the leisure moments of our professional and other readers, as one sure to repay tenfold both the cost and the trouble.

VARIORUM.

"Notes on North Italy and the Seat of War, in 1859," by the Rev. G. T. Hoare is the title of a *brochure* published by Aylott & Son, containing the substance of letters written last year in the vicinity of the scenes they describe.——"Shall Gothic Architecture be denied fair play?" heralds in some thoughts suggested by reading a pamphlet entitled, "Remarks on a National Style, in reference to the proposed Foreign Office." Like that to which it replies, it is issued by Messrs. Bell & Daldy. It is coolly and clearly written, but we do not find that it brings much that is new into the discussion. The writer quotes mainly from Mr. Scott's Academy lectures.

Miscellanea.

FEMALE SCHOOL OF ART.—The distribution prizes and rewards to the students of the Female School of Art and Design took place at the South Kensington Museum, on the 14th instant, under the presidency of Mr. Redgrave, R.A. (in the absence of Earl Granville, the Lord President of the Council). A large number of visitors were present, the majority being ladies. The chairman, in addressing the company, remarked that the school might be considered a great success; and the mode in which the prizes were awarded contributed in some respect to promote that success. A new phase, however, was now arriving in its career. The Government had hitherto provided a home and residence for the institution, and it was now thought advisable to place it on the same footing as other schools, and make it self-supporting. Subscriptions were, therefore, being raised to build a school for the purpose, and a committee were making the most active exertions to accomplish that object. The Royal Academy had responded by a gift of 50*l.*, and he believed there was every desire to support the institution, if its objects were only properly brought under the notice of the public. The largest number of medals awarded by the committee of this school was thirty, and there were now to be twenty-six recipients, whilst in the preceding year there were twenty-five. The winners of national medallions were not quite so numerous as last year. They were then four: they are now only two. The present was the last occasion on which they would assemble under the auspices of the Government; and on Thursday, the 21st of June, a *conversazione* would be held in the Museum for the purpose of raising a fund for erecting the building for the Female School of Art. The prizes were then awarded.

THE DRINKING FOUNTAIN MOVEMENT.—A drinking-fountain has been presented by Mr. Alderman Fisher, of Sheffield, to the Free Library there. It consists of a polished white marble basin, with mouldings, and with rim enriched with wreaths of flowers deeply incised. The back also is of white marble, the design being a carved shell surmounted by an arch of raised conventional flowers. The water spouts from the rolled head of a young fern leaf, also somewhat conventionally treated, and the whole is set in a frame of polished Aberdeen granite. The design was furnished by Mr. Godfrey Sykes, once a pupil of the local school of art, and it has been carved by Mr. T. Fidler, at present a pupil in the same school.

DRINKING FOUNTAIN, HYDE-PARK CORNER.—The drinking-fountain in front of St. George's Hospital, already alluded to, is completed, and has been in use during the last week. It is of stone, and has an Italian *Lavabo* character. The top is of pedimental form, surmounted by three small vases. There is a flat semi-circular-headed sinking in the face of the erection, and within this, against the back, is a group of bulrushes, in bronze, proceeding out of a mass of rock-work. From the leaves of the rushes, in two places, the water runs, and is received in a large marble shell. Below there is a dog-trough. The design is ascribed to Mr. Westmacott, R.A.

MONUMENTAL.—The municipal council of Brest voted the erection of an equestrian statue of the Emperor Napoleon III., in the public square of that town, but in reply to an announcement of that intention the Minister of the Interior received a letter from the Emperor, to be transmitted to the mayor of Brest, in which his majesty points attention to the fact that in general equestrian statues are only erected to sovereigns after their death, and that it was, in fact, proper that such popular homage should not have the appearance of a transitory flattery, but be a permanent impression of gratitude. "If the erection of an equestrian statue at Bordeaux, two years ago, was permitted," adds the Emperor, "it was because I was ignorant of the design, and it was done without my authorization."——At Novogorod, in Russia, a monument is about to be erected to commemorate the thousandth anniversary of the existence of Russia as a state. The construction of the pedestal at an expense of 75,000 roubles has already been contracted for, and the monument, in cast-iron, and which had been designed by M. Mitjeschine, is to cost 230,000 roubles. In addition to that sum the government is to supply the metal, of which 4,000 poods (the pood is nearly 34 lb.) will be required.

SOUTH KENSINGTON MUSEUM.—On Tuesday last, on the motion of Mr. Lowe, a select committee of the House of Commons was appointed "to inquire and report concerning the South Kensington Museum."

VENTILATION OF SCHOOLS.—This has always been a subject of interest with us, and our readers may recollect of our attempt, not long since, to make the state of close schools palpable to the eye-sight by means of engraving. We are, therefore, glad to observe that the subject is now exciting special attention. This year's reports of the inspectors of schools contain a number of representations on the bad ventilation of the schools they have visited. Lord Ducie, too, we notice, has written to the *Times*, in reference to a letter signed "Fresh Air," in that paper, recommending the plan of school ventilation adopted by Mr. M'Kinnell, of Glasgow, and it so happens that a correspondent of our own, "J. B.," writes us just now as to this plan, which, however, he maintains is no invention of Mr. M'Kinnell's; and, indeed, no one except those whose attention has only now been turned to the subject is likely to believe it to be so: nevertheless, Mr. M'Kinnell has obtained a patent for it, and a pecuniary grant from Government. The plan consists simply of (1) several air-pipes, 6 inches wide in the ceiling; (2) three holes, 1 inch wide, bored in the *lower* part of the window-frame; and three holes, half an inch wide, in the *upper* part; (3) numerous small holes bored in the bottom of the door. Now, not to speak of our own columns for the last sixteen or seventeen years, to which general reference might be made for similar arrangements, we may here say, that our correspondent, "J. B.," mentions the fact, that Sir Joseph Bankes, in the large edition of his "Universal Geography," states that this very plan was used for ventilating the cellars of houses in Vienna two centuries since.

WESTMINSTER PALACE WORKS.—In reply to questions put to the Chief Commissioner of Works in the Commons, Mr. Cowper has stated that Mr. E. W. Barry had been asked by the Government to act as architect in finishing the works in progress at the Houses of Parliament. The Commissioner at the same time spoke of his intention to remove the railing which surrounds the pedestal of the statue of Charles I. at Charing-cross. The appearance of the monument will be injured rather than improved by the removal.

THE LAMBETH SCHOOL OF ART.—At a *soirée* in this school, held on the 12th inst., twelve medals, twenty-six prizes, and three free student-ships were awarded to the students. The chairman of the committee alluded to the present effective state of the school and its future prospects. The ground for a new building, on the site of Vauxhall-gardens, has been purchased, and his Royal Highness the Prince of Wales will lay the foundation stone of the new art school at the end of this month. The chairman concluded by presenting a testimonial to the master on behalf of the students.

COMPETITION, SOUTH MOLTON.—Sir: Will you, as a champion of the architectural profession, call attention to the insulting advertisement headed "South Molton, Devon," in your paper of the 16th, in which it is condescendingly stated that "The person whose plan is adopted will be required to furnish *gratuitously* a specification and working details"? *Twenty-five pounds* is the premium generously offered, for which magnificent sum some *person* (some "young person," perhaps) is expected to do the duty of an architect to a building probably covering some acres of ground. —W. O.

PORTRAIT OF DR. TODD.—The friends and admirers of the late Dr. Todd, F.R.S., a man who was raising himself rapidly in public esteem, will be glad to hear that a portrait of him, carefully painted by Mr. Douglas Y. Blakiston, is about to be published by Messrs. Colnaghi and John Scott, at whose house, in Pall Mall, the picture may be seen. It is to be engraved by Mr. G. Zobell.

THE GUARDS' MEMORIAL, REGENT-STREET.—At last there are signs of progress, with this monument, which induce a hope that the scaffolding which has for some time disfigured Waterloo-place will one day be removed. The bronze figures of the Guards, which will form part of the memorial, have been raised into position.

WEEDS IN WATER.—The Weeds in the Serpentine, and the ornamental water in the Regent's-park, may be destroyed by throwing in, from time to time, large quantities of bay salt. This plan will prevent the water from growing putrid, and destroy the growth of the weeds. The suggestion has been made to the Commissioners of Woods and Forests. Advantage would result if we watered our streets with common salt dissolved in the water. The dust would be better laid, and remain much longer wet (from three to four hours) than where plain water is used. Moreover, sea-water, or a solution of common salt in water, absorbs rapidly carbonic acid gas.—J. B.

HEAD OF GARIBALDI.—Mr. Schenck, of Edinburgh, has lithographed a portrait of Garibaldi, made by Mr. Leyde from a medallion bust and photograph. The aspect is characteristic.

ACTION FOR SERVICES RENDERED AS A MANAGER OF MINERAL PROPERTY.—Shipton *v.* Jones.—This action, brought in the Court of Queen's Bench, at the end of last year, and moved from thence to Chester Spring Assizes, and subsequently, on the withdrawal of certain pleas, left to the arbitration of Mr. Phipson, of the Oxford Circuit, has lately been arranged between the respective counsel, the defendant to pay 1,000*l.* and costs. The plaintiff, Mr. J. A. Shipton, is a civil engineer, practising at Dudley, and in 1858 he entered into an agreement with the defendant, Mr. W. C. Hussey Jones, a large colliery proprietor near Mold, in Flintshire, for his services in managing a certain mineral property in that district, and in consequence of the disposal of that property his services were dispensed with, without being paid the consideration sum mentioned in the agreement in the event of such disposal; and it was to recover this and also salary and commission that the plaintiff sued. Mr. Quain was counsel for the plaintiff, and Mr. Welsby for the defendant.

THE PEOPLE'S HALL WORKS, BIRMINGHAM.—Mr. W. Greenway (formerly Webb & Greenway) who for many years has carried on the business of a general factor and brassfounder in Steelhouse and Summer-lanes, has completed new works in Loveday-street. It seems that Mr. Greenway, finding it extremely inconvenient to carry on his extensive business in two different localities, conceived the idea of purchasing the large building in Loveday-street, known as the People's Hall, with a view, not only to unite the two establishments in one, but to provide better and healthier accommodation for his workpeople. The purchase having been made, the assistance of Mr. John Bateman, architect, and Mr. Pashley, builder, was called in, and such alterations and additions made as were necessary to form a roomy and convenient *suite* of business apartments, and a good set of well-ventilated workshops, now termed the People's Hall Works. The *employés* have presented the proprietor with a silver claret jug and salver, as a token of their respect for him, and a testimonial to his exertions for their welfare.

TENDERS

For the new iron conservatory in the garden of the Horticultural Society, at Kensington:—

	Iron, &c.	Brick, &c.	Glazing, &c.	Totals.
	£.	£.	£.	£.
Peters	..	..	..	22,900
Weeks & Co.	18,500	4,300	..	22,800
Wenerleyck	11,332	8,284	2,524	22,640
Smith	14,288	4,760	2,066	21,114
Cotham & Co.	13,780	4,879	2,118	20,777
Henry Grisell	12,340	4,720	2,180	19,240
Lucas, Brothers	12,500	4,342	2,061	18,903
Kirke & Parry	9,690	3,960	1,820	15,470
Kelk (accepted)	9,434	3,625	1,460	14,519
Stap	8,328	4,393	1,741	14,462
Myers	8,642	3,865	1,660	14,167

For erecting a house to Mr. E. D. Rayment, on the Ware-road, Hertford. The architect's estimate, according to the *Herts Mercury*, was 2,500*l.*, or 1,289*l.* less than the lowest tender, and 4,040*l.* less than the highest tender:—

	Bath Stone.			Portland Stone.			Portland Cement.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
Soper, London	6,540	0	0	7,310	0	0	5,810	0	0
Gammon, London	5,700	0	0	6,119	0	0	5,235	0	0
French, Melbourne Cambridgeshire	5,665	0	0	5,915	0	0	....		
Little, London	5,569	0	0	5,169	0	0	5,070	0	0
Ridley, Hertford	5,377	5	3	5,734	15	3	4,527	15	0
Willson, London	4,981	0	0	5,481	0	0	4,481	0	0
Kirkby, near Biggleswade	4,796	0	0	5,162	10	0	4,329	0	0
Myers, London	4,784	0	0	5,130	0	0	4,554	0	0
Porter, London	4,740	0	0	5,340	0	0	4,440	0	0
Amos, London	4,485	0	0	4,890	0	0	4,121	0	0
Rowland, London	4,410	0	0	4,590	0	0	4,167	0	0
Coker, Ware	4,160	0	0	4,360	0	0	3,860	0	0
Norris, Hertford	4,018	18	0	....			3,701	18	0
Ekins & Son, Hertford	3,997	0	0	4,397	0	0	3,810	0	0
Rayment, Hertford	3,987	0	0	4,437	0	0	3,787	0	0
Brown, Ware	3,789	0	0	4,229	0	0	3,697	0	0
Lawrance, Hertford (too late)	4,075	10	0	4,425	10	0	3,887	10	0

For new County Court at Bow. (Quantities supplied). Mr. Chas. Reeves, county court surveyor:—

J. Haward	£7,250 0 0
J. M. Macey	7,180 0 0
Ashby & Horner	7,170 0 0
G. Mansfield & Son	7,140 0 0
W. Cubitt & Co.	6,944 0 0
T. Nixon	6,697 0 0

For the erection of schools, residence, &c. at Kirkburn, near Driffield. Mr. R. G. Smith, Hull, architect:—

Berry	£863 0 0
Shepherdson	765 0 0
Simpson & Malone (accepted)	750 0 0

For building Amersham Hall School, including domestic wings and offices, at Caversham, near Reading. Messrs. Haslam & Brickland, architects. Quantities supplied:—

Luker, Reading	£5,400 0 0
Oades & Son	5,292 0 0
Shepherd, Reading	5,273 0 0
Young & Co., Oxford	5,159 0 0
Orton & Child, Reading (accepted)	4,600 0 0

For nine almshouses on Lea-bridge-road, for the Master Bakers' Association. Mr. T. E. Knightley, architect:—

Ennor	£2,549 0 0
Woodward	2,428 0 0
Rickard & Son	2,395 0 0
Keyes & Head	2,340 0 0
Wood	2,123 0 0
Clark, Tottenham	1,778 0 0

For building additional wing to the Great Western Hotel, Reading. Mr. Wm. Brown, architect. Quantities supplied:—

S. Biggs, Reading	£1,675 0 0
Luker, ditto	1,630 0 0
Orton & Child, ditto	1,627 0 0
Woodroffe, ditto	1,622 0 0

For finishing six houses for Mr. Sewell, at Alland's-road, Kentish-town. Mr. John M. Dean, architect, Stratford:—

Adnam	£1,255 0 0
Slatford	1,148 0 0
Cumings	1,120 0 0
Porter	890 0 0
Davey	889 0 0
Harvey	847 0 0
Humphries & Luxford	769 0 0
Corderey	705 0 0
Hosking	669 0 0
Webb	430 0 0

For additions of conservatory, &c., to ditto:—

Humphries & Luxford	£212 0 0
Corderey	241 0 0
Hosking	160 0 0

For Parsonage House, Nottingham, for the Rev. G. Dundas, M.A. Mr. C. W. Edwards, architect. Quantities not supplied:—

Stevenson & Weston	£982 0 0
Joel Taylor	955 0 0
Robert Dennett	938 14 0
J. & T. Pickard & Co. (accepted)	930 0 0

For additions to premises Nos. 70 and 71, Edgeware-road, for Messrs. Nixon & Cooke. Mr. Wilkinson, architect:—

Tidy	£844 0 0
Lawrence	797 0 0
Geo. Fish	750 0 0
Keyes & Head	685 0 0
Longmire & Burge	649 0 0

For alterations to Messrs. Nisbet's premises, Berners-street, Oxford-street. Messrs. Reeves & Butcher, architects:—

	Messrs. Ashby & Horner.	Mr. Macey.
No. 1 Contract	£335 0 0	£325 0 0
No. 2 "	195 0 0	196 0 0
No. 3 "	203 0 0	196 0 0
Total	£733 0 0	£717 0 0

For North Hyde school. Messrs. Nelson & Innes, architects:—

Manley & Rogers	£369 0 0
Easton	280 0 0
Hanson	273 0 0
Jacklin	268 0 0
Adamson & Son	228 0 0
Nias	222 0 0

For repairs to Park Chapel, Camden-town. Mr. C. G. Searle, architect:—

Pickering	£376 0 0
Battersbury	363 0 0
Keys & Head	348 0 0
Tucker	341 0 0

TO CORRESPONDENTS.

A Looker-on.—S. B.—E. C. H.—W. H.—E. W.—R. B. E. (the opinion that reached us of the clearstory windows was not satisfactory. We showed our consideration by omitting it).—J. W. (it is a common proceeding when flooring-boards shrink to glue in slips of wood).—F. L.—J. F. D. (we cannot make an *ex parte* statement of that kind).—J. L.—Lux Parvula.—J. H.—W. J. N. (apply to Mr. Ransome, Canon-row, Westminster).—T. W. (we should expect nothing could be done with it but varnishing,—using perhaps a little stain in the varnish).—C. & K.—Messrs. H.—J. L.—H. B.—Pedestrian.—W. H.—H. & P.

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WILLIAM COXON, Clerk.
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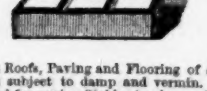
ESTABLISHED  1838

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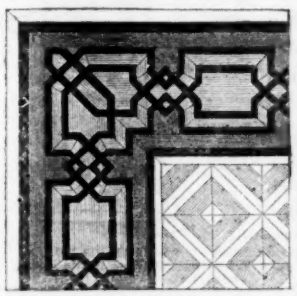

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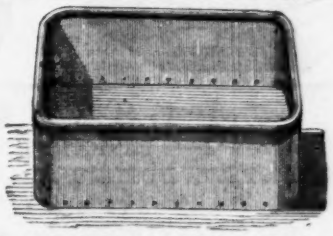

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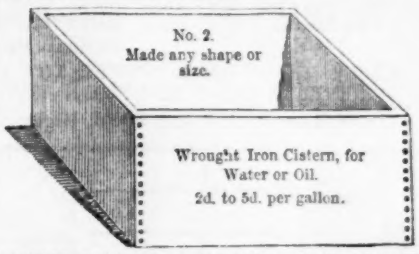

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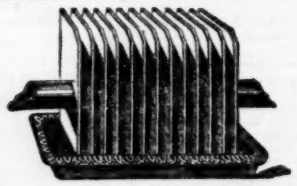

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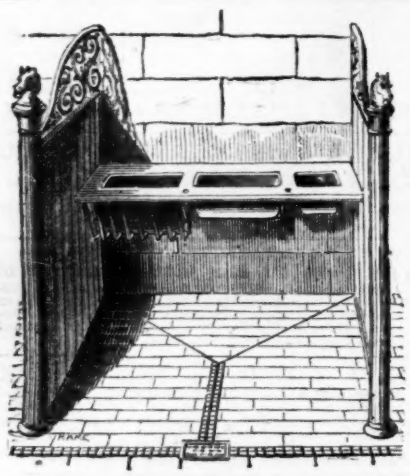

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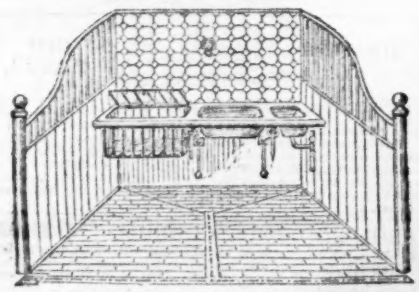

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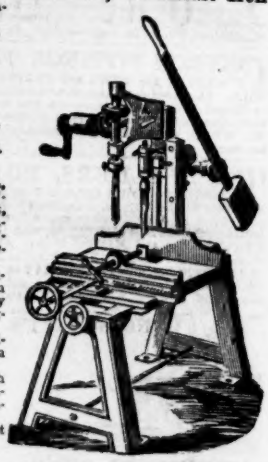

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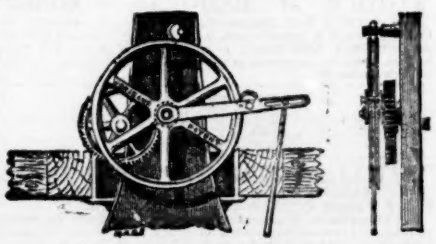

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